Enabling Open Access to and Re-Use of Publicly Funded Research Data in Malaysian Public Universities:
A Legal and Policy Analysis

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KEYWORDS

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ABSTRACT

Numerous statements and declarations have been made over recent decades in support of open access to research data. The growing recognition of the importance of open access to research data has been accompanied by calls on public research funding agencies and universities to facilitate better access to publicly funded research data so that it can be re-used and redistributed as public goods. International and inter-governmental bodies such as the ICSU/CODATA, the OECD and the European Union are strong supporters of open access to and re-use of publicly funded research data.

This thesis focuses on the research data created by university researchers in Malaysian public universities whose research activities are funded by the Federal Government of Malaysia. Malaysia, like many countries, has not yet formulated a policy on open access to and re-use of publicly funded research data. Therefore, the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. Policy development is very important if the objective of enabling open access to and re-use of publicly funded research data is to be successfully achieved.

In developing the policy, this thesis identifies a myriad of legal impediments arising from intellectual property rights, confidentiality, privacy and national security laws, novelty requirements in patent law and lack of a legal duty to ensure data quality. Legal impediments such as these have the effect of restricting, obstructing, hindering or slowing down the objective of enabling open access to and re-use of publicly funded research data. A key focus in the formulation of the policy was the need to resolve the various legal impediments that have been identified.

This thesis analyses the existing policies and guidelines of Malaysian public universities to ascertain to what extent the legal impediments have been resolved. An international perspective is adopted by making a comparative analysis of the policies of public research funding agencies and universities in the United Kingdom, the United States and Australia to understand how they have dealt with the identified legal impediments. These countries have led the way in introducing policies which support open access to and re-use of publicly funded research data. As well as proposing a policy supporting open access to and re-use of publicly funded research data in Malaysian public universities, this thesis provides procedures for the implementation of the policy and guidelines for addressing the legal impediments to open access and re-use.

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LIST OF ABBREVIATIONS

A2K	Access to Knowledge
AAU	Association of American Universities
AGU	American Geophysical Union
AHRC	Arts and Humanities Research Council (UK)
ALPSP	Association of Learned and Professional Society Publishers
ANDS	Australian National Data Service
ARC	Australian Research Council
ATA	Alliance for Taxpayer Access
ATSDR	Agency for Toxic Substances and Disease Registry (US)
AUD	Australian Dollar
BBB	Budapest Bethesda Berlin
BBSRC	Biotechnology and Biological Sciences Research Council (UK)
BOAI	Budapest Open Access Initiatives 2002
CARL	Canadian Association of Research Libraries
CC0	Creative Commons Zero Waiver "No Rights Reserved"
CC-BY	Creative Commons Attribution License
CDC	Centers for Disease Control and Prevention (US)
CDPA	Copyright, Designs and Patents Act 1988 (UK)
CD-ROM	Compact Disc, Read-Only-Memory
CEOS	Committee on Earth Observations Satellites
CI	Consumers International
CIDRC	Canadian International Development Research Centre
CIHR	Canadian Institutes of Health Research
CODATA	The Committee on Data for Science and Technology
CRUK	Cancer Research
Cth	Commonwealth (Australia)
CU	Cornell University (US)
DCC	Digital Curation Centre (UK)
DEST	Department of Education, Science and Training (Australia)
DNA	Deoxyribonucleic Acid
EAR	Division of Earth Sciences (US)
EC	European Commission
EIFL	Electronic Information for Libraries

EPSRC	Engineering and Physical Sciences Research Council (UK)
ERCIM	European Research Consortium for Informatics and Mathematics
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
ESDS	Economic and Social Data Service (UK)
ESRC	Economic and Social Research Council (UK)
EU	European Union
EUA	European University Association
FRGS	Fundamental Research Grant Scheme (Malaysia)
FRPAA	Federal Research Public Access Act (US)
GDP	Gross Domestic Product
GCOS	Global Climate Observing System
GNP	Gross National Product
GPL	GNU General Public License
GSU	Georgia States University
GU	Griffith University
HUGO	Human Genome Organisation
IAI	Information Alliance
IAP	The Inter Academy Panel
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic, Social and Cultural Rights
ICSU	International Council for Science
ICT	Information and Communication Technology
IFLA	International Federation of Library Associations and Institutions
IGBP	International Geosphere-Biosphere Program
IGY	International Geophysical Year
IIUM	International Islamic University of Malaysia
INSPIRE	Infrastructure for Spatial Information in Europe
IOC	Intergovernmental Oceanographic Commission of UNESCO,
IP	Intellectual Property
IPC	Intellectual Property Committee
IPMC	Intellectual Property Management Committee
IPR	Intellectual Property Rights
ISSC	International Social Science Council
JISC	Joint Information Systems Committee (UK)

MIMOS	Malaysian Institute Of Microelectronic Systems
MSC	Malaysian Multimedia Super Corridor
MMU	Multimedia University (Malaysia)
MOHE	Ministry of Higher Education (Malaysia)
MOSTI	Ministry of Science, Technology and Innovation (Malaysia)
MRC	Medical Research Council (UK)
MU	Monash University
NAS	National Academy of Science (US)
NCGP	National Competitive Grants Program (Australia)
NERC	Natural Environment Research Council (UK)
NGO	Non-Governmental Organisation
NHMRC	National Health and Medical Research Council (Australia)
NIH	National Institute of Health (US)
NOAA	US National Oceanic and Atmospheric Administration
NRC	National Research Council (Canada)
NSERC	Natural Sciences and Engineering Research Council of Canada
NSF	National Science Foundation (US)
OAI	Open Access Archives Initiative
OAK Law	Open Access to Knowledge Law Project (QUT)
OECD	Organisation for Economic Co-Operation and Development
OMB	Office of Management and Budget (US)
OpenAIRE	Open Access Repository Infrastructure for European Research Publications
OpenDOAR	Open Directory of Registered Repositories
PDDL	Public Domain Dedication and Licence
PPP Act	Printing Presses and Publications Act 1984 (Malaysia)
QUT	Queensland University of Technology
R&D	Research and Development
R&I	Research and Innovation
RCUK	Research Councils UK
RM	Ringgit Malaysia
ROARMAP	Repository of Open Access Material Archiving Policies
SEDAC	Socioeconomic Data and Applications Center of the Columbia University
SJTU	Shanghai Jiao Tong University

STFC	Science and Technology Facilities Council (UK)
STM	International Association of Scientific, Technical and Medical Publishers
THES	Times Higher Education Supplement
TWAS	The Academy of Sciences for the Developing World
UCAR	University Corporation for Atmospheric Research
UDHR	Universal Declaration of Human Rights
UE	University of Edinburgh
UiTM	MARA University of Technology (Malaysia)
UK	United Kingdom
UKM	National University of Malaysia
UKOLN	The United Kingdom Office for Library and Information Networking
UM	University of Malaya (Malaysia)
UMK	University of Malaysia Kelantan
UMP	University of Malaysia Pahang
UMS	University of Malaysia Sabah
UN	United Nations
UN	University of Newcastle Australia
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNH	University of New Hampshire (US)
UNIMAP	University of Malaysia Perlis
UNIMAS	University of Malaysia Sarawak
UNITEN	Tenaga Nasional University (Malaysia)
UPM	Putra University of Malaysia
UPNM	Malaysian National Defence University
UPSI	Sultan Idris Teaching University (Malaysia)
URL	Uniform Resource Locator
US	United States of America
USGCRP	US Global Change Research Program
USM	University of Science Malaysia
UT	University of Tennessee
UTEM	University of Technical Malaysia Melaka
UTM	Malaysian University of Technology
UTM	University of Technology Malaysia

UTP	Petronas Technology University (Malaysia)
UUK	Universities UK
UUM	Northern University of Malaysia
UW	University of Washington (US)
VARA	Visual Artists Rights Act 1990 (US)
VCU	Virginia Commonwealth University (US)
WDC	World Data Centers
WHO	World Health Organisation
WIPO	World Intellectual Property Organisation
WMO	World Meteorological Organization

STATEMENT OF ORIGINAL AUTHORSHIP

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

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Haswira Nor
November 27, 2012

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

The last two decades have seen increasing support for open access to knowledge and information especially that produced through scientific and scholarly research outputs. Open access is the term coined by researchers trying to remove access barriers to research.[1] Open access is largely seen by its supporters as a paradigm shift in the way researchers and scholars in the networked information age share their work with the public and the research community.[2] It provides an innovative way to overcome the technological and legal barriers which may cause research outputs to be locked up behind a closed access or toll access system.[3] It also provides a legitimate means of countering copyright-based restrictions which have been exploited to lock down culture and to control creativity. It does this by recognising the intellectual property rights of the creators and innovators while ensuring flows of creation and innovation through the free and permissive culture of open content licensing.[4]

Open access can be seen as part of the broader access to knowledge movement (A2K) which advocates the distribution of administrative, educational, intellectual, scientific, creative and innovative works online through permissive licenses by the right holders.[5] Compared to other initiatives which use A2K as their common

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1 According to Peter Suber, "Research" includes knowledge and knowledge claims or proposals, hypotheses and conjecture arguments and analysis, evidence and data, algorithms and methods, evaluation and interpretation, debate and discussion, criticism and dissent, summary and review. See Peter Suber, *Open Access* (MIT Press, Cambridge, Massachusetts 2012) 9, 112.

2 See Alma Swan, 'Open Access: Why Should We Have It?' (2006) Key Perspectives, <http://www.keyperspectives.co.uk/openaccessarchive/journalpublications.html> (at 22 March 2010); Simon Bains, 'Why Concept On-line: or, the History and Rationale of the Open Access Movement' (2009) 1(1) *Concept*, <http://ojs-live.lib.ed.ac.uk/index.php/Concept/article/viewFile/68/75> (at 7 February 2010); Carol Ebbinghouse, 'Open Access: The Battle for Universal, Free Knowledge' (2005) 13(3) *Searcher* 8.

3 See Jeremy Malcolm, 'Access to Knowledge for Consumers: Reports of Campaigns and Research 2008-2010' (Consumers International, 2010); John Willinsky, *The Access Principle: The Case for Open Access to Research and Scholarship* (MIT Press Cambridge, 2006).

4 Lessig famously describes this free and permissive culture not as "free" as in "free beer", but "free" as in "free speech." See Lawrence Lessig, Free Culture : The Nature and Future of Creativity (Penguin Books, New York, 2004).

5 See Jeremy Malcolm, 'Access to Information and Knowledge - Advancing Human Rights and Democracy' (2009), <http://a2knetwork.org/access-knowledge-access-information-and-

conceptual platform, open access focuses on subject matter which does not earn royalties for its creators who are mostly academic researchers in public higher learning institutions.[6] Open access harnesses the rapid development of the internet and information and communication technology (ICT) which has vastly increased the capacity to store and to share knowledge and information online.[7] The internet and ICT provide an opportunity to knowledge and information producers to utilise the information network and digital technology to gain more freedom and autonomy to share their works with the public.[8]

The emergence of support for open access is meticulously charted in Peter Suber's timeline covering the period 1990 to 2009.[9] The growing support has seen the scope and coverage of open access evolve over time.[10] The narrower scope of open access refers to the initiatives to provide free, unrestricted, on-line access to academic works, scholarly journal papers, primary scientific literature and research results through publication in open access journals or self-archiving in open access repositories.[11] Online open access repositories that provide persistent URLs and take steps for long term preservation are the preferred medium to self-archive the works.[12]

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knowledge-%E2%80%93-advancing-human-rights-and-democracy> (at 29 March 2010). See also, Frederick Noronha and Jeremy Malcolm (eds), *Access to Knowledge: A Guide for Everyone* (Consumers International, Kuala Lumpur, 2010).

6 See Charles A Schwartz, 'Reassessing Prospects for the Open Access Movement ' (2005) (November) *College & Research Libraries* 491; Carolina Almeida A Rossini, 'The Open Access Movement: Opportunities and Challenges for Developing Countries' (2007) 3, <http://campus.diplomacy.edu/env/scripts/Pool/GetBin.asp?IDPool=3737> (at 11 March 2010); Natali Helberger, 'A2K: Access to Knowledge – Make it Happen ' (2005), <http://www.indicare.org/tiki-read_article.php?articleId=102> (at 11 March 2010); Amy Kapczynski, 'The Access to Knowledge Mobilization and the New Politics of Intellectual Property' (2007-2008) 117 Yale LJ 804.

7 See John Houghton and Graham Vickery, 'Digital Broadband Content: Scientific Publishing' (OECD Directorate for Science, Technology and Industry Committee for Information, Computer and Communications Policy, 2005).

8 See Suber, above n 1, 43; Tony Hey, Stewart Tansley and Kristin Tolle (eds), *The Fourth Paradigm: Data Intensive Scientific Discovery* (Microsoft Research, 2009); Yochai Benkler, The Wealth of Networks (Yale University Press, New Haven, 2006) 59.

9 Peter Suber, 'Timeline of the Open Access Movement' (2009), <http://www.earlham.edu/~peters/fos/timeline.htm> (at 16 February 2010).

10 Most open access repositories were launched to host peer-reviewed research articles and their pre-prints but often they include other sorts of content as well such as datasets and digitised copy of works. See Suber, above n 1, 52.

11 See Charles W Bailey Jr, 'What is Open Access?' (2006), <http://www.digital-scholarship.org/cwb/WhatIsOA.htm> (at 16 February 2010); Norbert Lossau, 'The Concept of Open Access' in *Open Access: Opportunities and Challenges* (European Commission, 2008) 20; Barbara Meyers, 'Open Access: A Matter For Definition' (2004) *Society for Scholarly Publishing*, <http://snhs-plin.barry.edu/Research/online_access_SSP_Status_Report.pdf> (at 22 February 2010).

12 Suber, above n 1, 52.

Support for open access has broadened over the years to include many kinds of useful content including research data.[13] In Suber's timeline, the first documented support for open access to research data is a 1991 policy statement issued by the United States (US) Global Change Research Program setting out what are now known as the "Bromley Principles".[14] Support for open access to research data was recognised in the "Bermuda Principles" endorsed by the participants at the international strategy meeting on human genome sequencing in 1996.[15]

The first decade of the 21st century saw numerous statements in support of open access to research data.[16] The Access to Databases Principles published by the International Council for Science/Committee on Data for Science and Technology (ICSU/CODATA) in 2002 support open access to data required for scientific research and education.[17] The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities (2003) supports open access to original scientific research results, raw data and metadata, source materials, digital representations of pictorial and graphical and scholarly multimedia materials.[18]

Between 2004 to 2006, support for open access to research data came from a range of entities,[19] among others, the US National Oceanic and Atmospheric Administration (NOAA), the participants in the Ocean Biodiversity Informatics Conference, the Conference of Parties to the Convention on Biological Diversity, the participants in a CODATA workshop and Public GeoData.[20] The inclusion of

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13 Suber, above n 1, 98.

14 'Data Management for Global Change Research Policy Statements' (1991) *US Global Change Research Program*, <http://www.gcrio.org/USGCRP/DataPolicy.html> (at 24 February 2010).

15 Policies on Release of Human Genomic Sequence Data : Summary of Principles Agreed at the First International Strategy Meeting on Human Genome Sequencing' (2003) *Human Genome Project Information*, <http://www.ornl.gov/sci/techresources/Human_Genome/research/bermuda.shtml#1> (at 7 April 2010).

16 See Suber, above n 9.

17 ICSU/CODATA Ad Hoc Group on Data and Information, 'Access to Databases: Principles for Science in the Internet Era' (2002), <http://www.codata.org/codata/data_access/principles.html> (at 29 March 2010).

18 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities' (2003) Max Planck Society, <http://oa.mpg.de/lang/en-uk/berlin-prozess/berliner-erklarung/> (at 25 February 2010).

19 See Suber, above n 9.

20 On 17 February, 2006, Public GeoData launched an online petition calling for open access to publicly-funded geodata in Europe. On 17 April, 2006, participants in a CODATA workshop (Pretoria, September 5-7, 2005) released a report urging Southern African institutions to mandate open-access archiving and promote data sharing. See Suber, above n 9.

research data as part of the open access initiatives is also supported by the Amsterdam Principles (2008) which explore various approaches towards development of a framework of data release and sharing principles that will most effectively fulfil the needs of the funding agencies and the research community.[21]

Throughout 2009, support for open access to research data came from the Toronto Statement which supports rapid pre-publication data release for large scale research projects,[22] the Rome Agenda which supports post-publication data being made available immediately through public databases,[23] and the statement from the Yale Roundtable which supports open release of gene sequence data.[24] They were followed by the Panton Principles for Open Data in Science (2010) which support scientific data being made open to society.[25] These statements have the effect of broadening the scope and coverage of open access to research data to include pre-published, published and unpublished data, in particular the research data which is generated by using public funds.[26] Among the generic names given to open access to research data are open data, open access data and open science data.[27]

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21 See Henry Rodriguez et al, 'Recommendations from the 2008 International Summit on Proteomics Data Release and Sharing Policy - The Amsterdam Principles' (2009) 8(7) *Journal of Proteome Research* 1.

22 See Toronto International Data Release Workshop Authors, 'Prepublication Data Sharing' (2009) 461(10 September 2009) *Nature* 168.

23 See Paul N Schofield et al, 'Post-Publication Sharing of Data and Tools' (2009) 461(10 September 2009) *Nature* 171.

24 'Data and Code Sharing Roundtable ' (2009) *Yale Law School*, <http://www.law.yale.edu/intellectuallife/codesharing.htm> (at 4 April 2010).

25 Peter Murray-Rust et al, 'Panton Principles: Principles for Open Data in Science' (2010), <http://pantonprinciples.org/> (at 12 April).

26 See Barbara Quint, 'OECD Ministers Support Open Access for Publicly Funded Research Data' (2004), <http://newsbreaks.infotoday.com/nbReader.asp?ArticleId=16519> (at 15 January 2010); Alliance for Taxpayer Access, 'Worldwide Momentum for Public Access to Publicly Funded Research' (2006), <http://www.taxpayeraccess.org/issues/access/access_resources/worldwide-momentum-for-public-access-to-publ.shtml> (at 24 June 2010).

27 See John Willinsky, 'The Unacknowledged Convergence of Open Source, Open Access, and Open Science' (2005) 10(8) *First Monday*, <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1265/1185> (at 27 May 2011); Tracey P Lauriault and Hugh McGuire, 'Open Data' (2008) (February) *Open Source Business Resource*, <http://www.osbr.ca/ojs/index.php/osbr/article/view/514/473> (at 7 July 2010); D John Doyle, 'Understanding the Open Access Data Movement' (2007) 54(11) *Canadian Journal of Anesthesia* 949; Peter Murray-Rust, 'Open Data in Science' (2008) *Nature Precedings*, <http://precedings.nature.com/documents/1526/version/1> (at 25 March 2010).

1.2 FOCUS OF THIS THESIS

This thesis focuses on publicly funded research data which provides a wealth of information and knowledge and is a primary component of research outputs.[28] The ICSU's Committee on Scientific Planning and Review, in its report on scientific data and information, acknowledges that research data could be produced from analysis of data as well as the results of research, rendering the input-output distinction of research data meaningless.[29] Similarly, the US National Science Foundation has also classified research data both as products of research (output), and the starting point for new research (input).[30] Despite being an important input or output of research, no standard definition of research data currently exists. For the purpose of this thesis, the terms "Research Data" and "Publicly Funded Research Data" are defined in section 1.3 below.

Open access to publicly funded research data is an initiative that runs alongside open access publication.[31] The Finch Report "On Expanding Access to Published Research Findings" stressed that publishers have an important role to play in making the data that researchers produce more readily available for others to use and re-use. The Finch report also made a recommendation for the infrastructure of subject and institutional repositories which provide access to research data and to grey literature to be developed to complement formal publishing.[32]

Compared to open access publication, open access to research data is broader in scope. Apart from providing open access to published data, it also provides pre-

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[28] Data, knowledge, information and wisdom have a symbiotic relationship. Information is data together with context which answers 'who', 'what', where' and 'when'. Knowledge (tacit or codified) is information that answers the "how" question. Wisdom is knowledge in an ethical or moral framework, to discern between right and wrong, good and bad. See Paul Cooper, 'Data, Information and Knowledge' (2010) 11(12) *Anaesthesia and Intensive Care Medicine* 505; John A Lee, 'Data, Information and Knowledge' (2002) 3 *Oncology* 384.

[29] Committee on Scientific Planning and Review, 'Scientific Data and Information: A Report of the CSPR Assessment Panel' (International Council for Science, 2004), 14.

[30] The US National Science Foundation describes digital data as both the products of research (output) and the starting point for new research (input). See Kathleen Shearer, 'Research Data: Unseen Opportunities' (The Canadian Association of Research Libraries, 2009), 4.

[31] There are many ways to deliver open access (such as through personal websites, blogs, wikis, database, e-books etc), but two most dominant methods of delivery are i) publication in open access journals); and ii) self-archiving in open access repositories (Green Road). See Peter Suber, above n 1, 49; Stevan Harnad et al, 'The Access/Impact Problem and the Green and Gold Roads to Open Access' (2004) 30(4) Serials Review 310.

[32] Janet Finch, 'Report of the Working Group on Expanding Access to Published Research Findings' (Research Information Network, 2012).27, 98.

published and unpublished research data in scientific and non-scientific fields.[33] Efforts to enable open access to research data can be traced back to 1955 with the formation of World Data Centers (WDC) by the International Council of Scientific Unions. The WDC's aim was to maximise data accessibility by making available the research data in machine-readable form.[34]

Since the formation of the WDC, there have been worldwide initiatives for free and open sharing of research data. From July 1957 to December 1958, scientists from the 67 nations which participated in the International Geophysical Year (IGY) agreed to share data generated from cosmic ray, climatology, oceanography, earth's atmosphere and magnetic research.[35] A year later, the Antarctic Treaty 1959 was signed by 13 governments which agreed that scientific observations and results from Antarctica shall be exchanged and made freely available as part of international scientific cooperation.[36]

The earlier open access to research data initiatives took place before the era of the internet. The internet era began around 1982 with the standardisation of the Internet Protocol Suite (TCP/IP) and the introduction of a world-wide network of fully interconnected TCP/IP networks called the "Internet".[37] Fast forward to the era of the internet, the availability of fast, ubiquitous online networks has significantly changed the method of data release.[38] As early as 1990, there were at least two open access to research data initiatives undertaken by the Committee on Earth Observations Satellites (CEOS) and the International Geosphere-Biosphere Program (IGBP) which utilised the internet.

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33 See Houghton and Vickery, above n 7; Alok Jha, 'Wikipedia Founder to Help in Government's Research Scheme: Academic Spring Campaign Aims to Make All Taxpayer-Funded Academic Research Available for Free Online' (2012), <http://www.guardian.co.uk/technology/2012/may/01/wikipedia-research-jimmywales-online/print> (at 5 May 2012).

34 Wikipedia, 'Open Data', <http://en.wikipedia.org/wiki/Open_Data> (at 5 October 2011).

35 Anonymous, 'International Geophysical Year' (2012), <http://www.nas.edu/history/igy/> (at 8 May 2012).

36 See 'Antarctic Treaty 1959' British Antarctic Survey <http://www.antarctica.ac.uk/about_antarctica/geopolitical/treaty/update_1959.php> (at 10 April 2010).

37 See Barry M Leiner et al, 'Brief History of the Internet' (1999), <http://www.internetsociety.org/internet/internet-51/history-internet/brief-history-internet> (at 2010); 'History of the Internet' *Wikipedia*, <http://en.wikipedia.org/wiki/History_of_the_Internet> (at 15 June 2010).

38 Houghton and Vickery, above n 7.

Online open access initiatives were also launched by the US Global Change Research Program (USGCRP) in 1991, followed by the Inter-American Institute for Global Change Research and the Framework Convention on Climate Change in 1992. Between 1993 and 1997, several other open access initiatives utilising the internet and ICT were initiated by the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the Global Climate Observing System (GCOS), the International Social Science Council (ISSC), the World Meteorological Organization (WMO), the University Corporation for Atmospheric Research (UCAR), the Human Genome Project and the American Geophysical Union (AGU).[39] The success of these initiatives which released research data online sparked other open access initiatives for research data in the fields of biological, proteomics, epidemiological, health and other scientific research.[40]

The open access initiatives involving research data undertaken by these research institutions/organisations are summarised in Table 1.1 below.

Table 1.1 Open Access Initiatives Involving Research Data

INSTITUTIONS/ORGANISATIONS	YEAR	OPEN ACCESS INITIATIVES
Committee on Earth Observations Satellites	1990	Provide non-discriminatory and full access to data which will be made available to the international community.
International Geosphere-Biosphere Program	1990	Data should be made openly available as soon as they become widely useful.
US Global Change Research Program	1991	Full and open sharing of the full suite of global data sets for all global change researchers is a fundamental objective. Facilitate full and open access to quality data for global change research (The Bromley Principles).
Inter-American Institute for Global Change Research	1992	Promote the full, open, and efficient exchange of data and information between the institute and the parties.
Framework Convention on Climate Change	1992	Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related

[39] See ICSU/CODATA, 'Scientific Access to Data and Information', <http://www.codata.org/codata/data_access/policies.html> (at 15 March 2010); See also, 'Policies on Release of Human Genomic Sequence Data : Summary of Principles Agreed at the First International Strategy Meeting on Human Genome Sequencing' (2003) Human Genome Project

[40] Victoria Stodden, 'From Bermuda to Toronto to New Haven: Open Data and Code in Bioinformatics' (2009), <http://www.stanford.edu/~vcs/talks/GersteinVCS12102009.pdf> (at 25 February 2010).

		to the climate change.
Intergovernmental Oceanographic Commission of UNESCO	1993	IOC policy is to facilitate full and open access to quality ocean data for global ocean research programs.
Global Climate Observing System	1993	Data should be made available as soon as possible.
International Social Science Council	1994	Full and open sharing of the full suite of datasets for all social scientists is a fundamental goal.
World Meteorological Organization	1995	WMO World Data Center facilitates full, open and prompt availability of quality assured data.
University Corporation for Atmospheric Research	1995	Support the principle of free and open exchange of meteorological data and oppose attempts to place restrictions on this exchange..
Human Genome Project	1996	All human genomic sequence information should be freely available over the internet (The Bermuda Principles).
American Geophysical Union	1997	AGU supports and encourages the full and open sharing of Earth and space science data for research and education.

Specific support for open access to and re-use of publicly funded research data came from the Organisation of Economic Co-Operation and Development (OECD) in 2004 and the ICSU/CODATA in 2005.[41] In the Declaration on Access to Research Data from Public Funding adopted on 30 January 2004, the OECD recognised that open access to and unrestricted use of data promotes scientific progress and facilitates the training of researchers.[42] The ICSU/CODATA, in launching its Global Information Commons for Science Initiative in 2005, announced that the initiative would increase the effectiveness of activities directed to facilitating various methods of open access to and re-use of publicly funded scientific data and information.[43] The proposed A2K Treaty which was a civil society led initiative specifically requires

41 Suber, above n 9.

42 See 'Declaration on Access to Research Data From Public Funding' (2004) *OECD*, <http://www.oecd.org/document/0,2340,en_2649_34487_25998799_1_1_1_1,00.html> (at 25 February 2010); OECD Committee for Scientific and Technological Policy, 'Science, Technology and Innovation for the 21st Century. Meeting of the OECD Committee for Scientific and Technological Policy at Ministerial Level 29-30 January 2004 - Final Communique' (OECD, 2004).

43 ICSU/CODATA Ad Hoc Group on Data and Information, above n 17.

government funded research to be made available to the public at no charge within a reasonable time frame.[44]

Public research funding agencies especially from the OECD and EU countries have taken the lead by encouraging or mandating open access to publicly funded research data. On 1 March 2002 the National Institutes of Health (NIH) issued a statement on sharing of research data as part of its long-standing policy to share and make available to the public the results and accomplishments of the activities that it funds.[45] In December 2007, the NIH adopted an open access mandate for NIH-funded research which has been followed by other public research funding agencies in the US.[46]

Canada launched a National Consultation on Access to Scientific Research Data in 2004.[47] In 2005, the Canadian National Research Council introduced a strategic plan to exploit publicly funded data and information through the supply of universal, seamless and permanent access to scientific, technological and medical data and information.[48] Another public research funder, Canadian Institutes of Health Research (CIHR) also developed its own access to research outputs policy which

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44 See Article 5-2 – Access to Public Funded Research, 'Treaty on Access to Knowledge' (2005) *Consumer Project on Technology* <http://www.cptech.org/a2k/a2k_treaty_may9.pdf> (at 10 March 2010). See also, Cluster C: Technology Transfer, Information and CommunicationTechnologies (ICT) and Access to Knowledge, World Intellectual Property Organisation, 'The 45 Adopted Recommendations under the WIPO Development Agenda' (2007), <http://www.wipo.int/ip-development/en/agenda/recommendations.html#b> (at 27 February 2010).

45 National Institute of Health (US), 'NIH Data Sharing Policy' (2003), <http://grants.nih.gov/grants/policy/data_sharing/> (at 26 February 2010).

46 See Peter Suber, 'Open Access in 2008: Open Access Policies at Funding Agencies' (2009) 12(1) *The Journal of Electronic Publishing*, <http://quod.lib.umich.edu/j/jep/3336451.0012.104?rgn=main;view=fulltext> (at 26 February 2010). See also, 'Final NIH Statement on Sharing Research Data' (2003) *National Institutes of Health*, <http://grants.nih.gov/grants/guide/notice-files/NOT-OD-03-032.html> (at 23 February 2010); National Institute of Health (NIH) Data Sharing Policy and Implementation Guidance 2003; National Science Foundation (NSF) Award and Administration Guide 2011; Centers for Disease Control and Prevention (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR) Policy on Releasing and Sharing Data 2005; Division of Earth Sciences of National Science Foundation (NSF) Policy Statement on Dissemination and Sharing of Research Results 2010.

47 See Anonymous, 'CIHR Consultation: Developing a CIHR Access to Research Outputs Policy' (Canadian Institutes of Health Research, 2007).

48 'NRC-CISTI Strategic Plan 2005-2010: Exploiting Information for Innovation' (2010) *National Research Council Canada*, <http://cisti-icist.nrc-cnrc.gc.ca/eng/ibp/cisti/about/strategic-plan05/innovation.html> (at 25 March 2010).

includes research data.[49] The Ontario Institute for Cancer Research (OICR) also requires deposition of research data in open access archives immediately after publication of results.[50]

China, a non-OECD member country established a Scientific Data Sharing Program and unveiled its plans to boost scientific data sharing in 2006. To achieve its goal, China announced that it would establish 40 scientific data centres by 2010, covering 300 databases relating to the environment, agriculture, human health, pure science, engineering and regional scientific and technology information. All these databases can be openly accessed through a public portal developed by its Ministry of Science and Technology. [51]

In Australia, the report of the review of Australian innovation system in 2008, "Venturous Australia: Building Strength in Innovation", made a series of recommendations aimed at unlocking public information and content, including the results of publicly funded research. Recommendation 7.7 states that Australia should establish a National Information Strategy to optimise the flow of information whereby researchers and others must have access to high quality data not just in their field but beyond. Further, in Recommendation 7.10 it is stated that a specific strategy for ensuring the scientific knowledge (including data) produced in Australia is placed in machine searchable repositories should be developed and implemented using public funding agencies and universities as drivers.[52]

Following the recommendations, Australia introduced a Research Accessibility Framework whereby outputs of publicly funded research, including research data, is

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49 Canadian Institutes of Health Research, 'Draft Policy on Access to CIHR-Funded Research Outputs', <http://www.cihr-irsc.gc.ca/e/32326.html> (at 12 May 2010).

50 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=214> (at 21 June 2010).

51 See Hawk Jia, 'China Unveils Plans to Boost Scientific Data Sharing' (2006), <http://www.scidev.net/en/news/china-unveils-plans-to-boost-scientific-data-shari.html> (at 1 March 2010).

52 Terry Cutler, 'Venturous Australia: Building Strength in Innovation' (Cutler & Company Pty Ltd, 2008); Stevan Harnad, 'Australian Innovation Report Recommends Open Access to Research Outputs' (2008), <http://openaccess.eprints.org/index.php?/archives/459-Australian-innovation-report-recommends-Open-Access-to-research-outputs.html> (at 3 June 2010).

managed in ways that maximise public benefit, through access and re-use.[53] The Australian Research Council (ARC) and the National Health and Medical Research Council (NHMRC) both encourage deposition of research data in open access archives within 6 months after project completion for the ARC and at the earliest possible opportunity for the NHMRC.[54]

The European Commission (EC) has also proposed open access to publicly funded research data as part of its recommendation to facilitate knowledge transfer activities by universities and other public research organisations.[55] In January 2008, the European Research Council (ERC) became the first funding agency in the European Union (EU) to adopt an open access mandate which applies to data as well as peer-reviewed articles. The ERC requires deposition of research data in open access repositories within 6 months after project completion.[56] In July 2012, the EC launched a proposal to open up research funded by its Horizon 2020 research programme and urged member states to do likewise.[57]

Other public research funding agencies within EU member countries have also introduced open access to research data policy. The Austrian Science Fund requires deposition of research data in open access archives within 2 years after project completion.[58] The German Research Foundation and the Flanders Research Foundation in Belgium encourage deposition of research data in open access

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53 See Mike Sargent, 'An Australian e-Research Strategy and Implementation Framework: Final Report of the e-Research Coordinating Committee' (Australian Government, 2006).

54 See 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=15> (at 21 June 2010); 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=17> (at 21 June 2010).

55 See Verheugen, Günter and Janez Potočnik, 'Commission Recommendation on the Management of Intellectual Property in Knowledge Transfer Activities and Code of Practice for Universities and other Public Research Organisations' (Commission of the European Communities 2008), Annex II, 9[16]. See also, Jonathan Gray, 'European Commission Launches Open Data Strategy for Europe' (2011) *Open Knowledge Foundation Blog*, <http://blog.okfn.org/2011/12/12/european-commission-launches-open-data-strategy-for-europe/> (at 1 Februaty 2012).

56 See Suber, above n 46. See also, 'Sherpa Juliet: Research Funders' Open Access Policies' *University of Nottingham*, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=31> (at 21 June 2010).

57 Richard van Noorden, 'Europe Joins UK Open-Access Bid' (2012) 487 *Nature* 285.

58 See 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=13/> (at 21 June 2010).

repositories within 12 months after project completion.[59] The Hungarian Scientific Research Fund (OTKA) requires deposition of research data in open access archives effective for all new projects from 30 June 2009.[60] It was also reported that the Swedish National Data Service is also promoting open access to research data although no formal policy is yet in place.[61]

In April 2011, Research Councils UK published Common Principles on Data Policy which state that publicly funded research data should be made openly available with as few restrictions as possible.[62] The UK Medical Research Council (MRC), the Biotechnology and Biological Sciences Research Council (BBSRC), the Economic and Social Research Council (ESRC), the Natural Environment Research Council (NERC), and Cancer Research UK (CRUK) are among public research funding agencies in the UK which require deposition of research data in open access archives.[63]

Beginning in June 2012, the UK intensified its open access initiatives by making all taxpayer-funded academic research in Britain available online whereby research data will be published alongside an article in an open format, available for use free of charge. The UK Government's 'Open Data White Paper' urged the funding agencies to have clear, enforceable open access arrangements for published research findings as well as ensuring that the associated data is also, where appropriate, made available and shared. The White Paper reports that Government departments are also

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59 See 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=5> (at 21 June 2010); 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=23/> (at 21 June 2010).

60 See 'Sherpa Juliet: Research Funders' Open Access Policies' University of Nottingham, <http://www.sherpa.ac.uk/juliet/index.php?fPersistentID=293> (at 21 June 2010).

61 See Carina Carlhed and Iris Alfredsson, 'Swedish National Data Service's Strategy for Sharing and Mediating Data: Practices of Open Access to and Reuse of Research Data - the State of the Art in Sweden 2009' (2008) 32(1-4) IASSIST Quarterly 30, <http://www.iassistdata.org/downloads/iqvol321_4alfredsson.pdf> (at 6 February 2012).

62 Research Councils UK (RCUK) Common Principles on Data Policy

63 See Medical Research Council (MRC) Policy on Data Sharing and Preservation; Principles for Access to and Use of Medical Research Council (MRC) Funded Research Data; UK Engineering and Physical Sciences Research Council (EPSRC) Policy on Research Data 2011; Economic and Social Research Council (ESRC) Research Data Policy 2010; Natural Environment Research Council (NERC) Data Policy 2011; Biotechnology and Biological Sciences Research Council (BBSRC) Data Sharing Policy 2010; Cancer Research UK (CRUK) Policy on Data Sharing and Preservation 2009.

committed to opening up their own research data as quickly and in as much detail as possible.[64]

It can be seen that open access to publicly funded research data is no longer a marginal, scholar-driven initiative but a mainstream movement which has been adopted by governments and public research funding agencies around the world. As observed by Suber, with or without mandates, more governments have committed themselves to open access to publicly funded data.[65] An extensive list of open access policies, practices and licensing to research data produced by publicly-funded research projects in Australia and selected jurisdictions can be found in Anne Fitzgerald's review of the literature on open access.[66] Today, there are at least 10 countries with policies which support open access to and re-use of publicly funded data research data.[67] The countries and their institutions with such policies are summarised in Table 1.2 below.

Table 1.2 Countries with Policies Which Support Open Access to and Re-Use of Publicly Funded Research Data

	COUNTRIES	INSTITUTIONS
1.	Australia	Australian Research Council (ARC) National Health and Medical Research Council (NHMRC)
2.	Austria	Austrian Science Fund
3.	Belgium	Research Foundation (Flanders)
4.	Canada	Canadian Institutes of Health Research (CIHR) Ontario Institute for Cancer Research (OICR) Heart and Stroke Foundation of Canada (HSF) Genome Canada
5.	European Union	European Research Council (ERC)
6.	Germany	German Research Foundation
7.	Hungary	Hungarian Scientific Research Fund (OTKA)
8.	Ireland	Higher Education Authority (HEA) Science Foundation Ireland (SFI)
9.	United Kingdom	Medical Research Council (MRC)

64 Minister of State for the Cabinet Office and Paymaster General, 'Open Data White Paper: Unleashing the Potential' (The UK Government, 2012); See also, Jha, above n 33.

65 Peter Suber, 'Open Access in 2007' (2008) (117) *SPARC Open Access Newsletter*, <http://www.earlham.edu/~peters/fos/newsletter/01-02-08.htm> (at 5 October 2011).

66 Anne M Fitzgerald, 'Open Access Policies, Practices and Licensing: A Review of the Literature in Australia and Selected Jurisdictions' (Queensland University of Technology, 2009).

67 See 'Sherpa Juliet: Research Funders' Open Access Policies' *University of Nottingham*, <http://www.sherpa.ac.uk/juliet/index.php> (at 21 June 2010);

		Biotechnology and Biological Sciences Research Council (BBSRC) Engineering and Physical Sciences Research Council (EPSRC) Economic and Social Research Council (ESRC) Natural Environment Research Council (NERC) Science and Technology Facilities Council (STFC) Cancer Research UK (CRUK)
10.	United States	National Institutes of Health (NIH) Centers for Disease Control and Prevention (CDC) Agency for Toxic Substances and Disease Registry (ATSDR) National Science Foundation (NSF) Division of Earth Sciences of NSF (EAR)

1.3 TERMINOLOGY

For the purpose of clarity, it is important to define the terms and phrases used throughout this thesis. The "**Malaysian Public Universities"** refers to higher education institutions that are listed by the Malaysian Higher Education Department in its current and future lists as the public universities in Malaysia. At present, there are 20 public universities in Malaysia comprising five public research universities and 15 public non-research universities.[68] Among the Malaysian public universities, the term **"Research"** is defined as a systematic activity across disciplines in the natural and applied sciences, social sciences and humanities to create, advance and increase the stock of knowledge and the use of this stock of knowledge for commercial, industry, public or academic needs.[69] The public research funding agencies in Malaysia classify research funded by them into pure/basic/fundamental research and applied/experimental/strategic research.[70]

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[68] See 'Categories of Public HEIs' (2011) *Jabatan Pengajian Tinggi*, <http://jpt.mohe.gov.my/> (at 25 February 2011).

[69] See Universiti Malaya (UM) Research and Development Policy 2002, Clause 2.0 Definition - Research; Universiti Kebangsaan Malaysia (UKM) Research Policy, Clause 2 – Interpretation of Research; Universiti Putra Malaysia (UPM) Research Policy 2009, Clause 1.2 – General; Universiti Teknologi Malaysia (UTM) Research and Development Policy 2003, Clause 2.1 – Introduction; Universiti Pendidikan Sultan Idris (UPSI) Research Guidelines, Clause 2 Interpretation – Research.

[70] See Science Fund Guidelines for Applicants, Types of Research, [1.5]; Ministry of Higher Education (MOHE) Application Guidelines for Fundamental Research Grant Scheme (2010 Amendment) Definition of Fundamental Research Grant Scheme, [1.2]; Users' Manual for

The term **"Publicly Funded Research"** is broadly defined in the OECD Principles and Guidelines for Access to Research Data from Public Funding as research conducted by government agencies or departments, or conducted using public funds provided by any level of government. [71] In the context of this thesis, **"Publicly Funded Research Data in Malaysian Public Universities"** refers to research data which are created by an individual researcher or a group of researchers comprising at least one researcher who is attached to the Malaysian public university, as:

i) an employee of the university (academic, non-academic, permanent, temporary, full-time, part-time or casual employee);

ii) a non-employee of the university (such as visitor, associate or adjunct attached to the university under contracts or agreements); or

iii) a registered student of the university;

from research activities which are fully funded by the federal government of Malaysia (collectively referred as the "**University Researchers**"). Such funding may be provided to the university researchers either through the university's internal research grants or the university's external research grants disbursed by the government's ministries or agencies through the universities.[72]

The term **"Research Data"** is defined in the OECD Principles and Guidelines for Access to Research Data from Public Funding as the factual records (numerical scores, textual records, images and sounds) used as primary sources for scientific research and which are commonly accepted in the scientific community as necessary

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IRPA Programme 8th Malaysia Plan: Guidelines for the Application (Volume 1), Chapter 1 Introduction – Purpose of the IRPA Program.

71 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

72 In term of University's External Research Grants, there are two major public research funding agencies in Malaysia i.e. the Ministry of Science, Technology and Innovation (MOSTI) and the Ministry of Higher Education (MOHE). The MOSTI and the MOHE administer three largest public funded research grants available to the public universities of Malaysia i.e. the Science Fund, the Fundamental Research Grant Scheme (FRGS), and the Intensification of Research in Priority Area (IRPA) Research Grant. The MOHE's Fundamental Research Grants Scheme (FRGS) is opened to all academic staffs of Malaysian public universities either permanent or contracts provided they are Malaysian citizens. See Ministry of Higher Education (MOHE) Application Guidelines for Fundamental Research Grant Scheme (2010 Amendment), Conditions of Application, [1.5.1] – [1.5.3]. For the non-citizens they are required to conduct the research with a co-researcher who is a Malaysian citizen of permanence resident. See Ministry of Higher Education (MOHE) Application Guidelines for Fundamental Research Grant Scheme (2010 Amendment), Conditions of Application, [1.5.4]. The field of research covered by the FRGS grant is diverse including pure science, applied science, technology and engineering, clinical and health sciences, social sciences, art and applied arts and also natural sciences and national heritage. See Ministry of Higher Education (MOHE) Application Guidelines for Fundamental Research Grant Scheme (2010 Amendment, Field of Research, [1.4].

to validate research findings.[73] The Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age, representing three influential research organisations in the US defines **"Research Data"** as information used in research to generate research conclusions which includes raw data, processed data, published data and archived data and exist in the form of textual, numeric, equation, statistics, images (whether fixed or moving), diagrams or audio recordings.[74]

Another United States research organisation, the National Science Board, defines **"Research Data"** as any information that can be stored in digital form, including text, numbers, images, video or movies, audio, algorithms, equations, animations, models, simulations, etc.[75] According to the Social Sciences and Humanities Research Council of Canada, **"Research Data"** includes qualitative, social, political and economic data sets, qualitative information in digital formats, experimental research data, still and moving image and sound data bases and other digital objects used for analytical purposes in research.[76]

From the above definitions, it is clear that research data whether published data or unpublished data are produced in various types and formats comprising of textual records (such as survey data, questionnaires, interview guides, a spreadsheet of ocean temperatures), numerical scores (such as equations, statistics, a list of numbers, dates), compilation (such as database, data sets), images (whether fixed images such as photos, diagrams, maps, tables, drawings, charts, slides or moving images such as videos, movies, animations, simulations), sounds (which include audio recording) and algorithms.

From the definitions, it could also be deduced that research data may exist in both digital and non-digital formats. The CODATA Berlin Conference Discussion Paper, "Towards International Guidelines for Access to Research Data from Public Funding", states that all types and forms of research data which are collected and

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73 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

74 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, 'Ensuring the Integrity, Accessibility, and Stewardship of Research Data in the Digital Age' (National Academy of Sciences, National Academy of Engineering and Institute of Medicine, 2009), 22.

75 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 23.

76 Social Sciences and Humanities Research Council of Canada (SSHRC) Research Data Archiving Policy

prepared with a suitable research methodology are relevant to data access and re-use regimes.[77] However, for the purpose of enabling open access and re-use, this thesis adopts the OECD Principles and Guidelines for Access to Research Data from Public Funding which are aimed at research data which exist in digital and computer-readable format.[78] This thesis also adopts Peter Suber's observation that research data either born digital or digitised from print, microfiche, film and other media.[79]

As for the term **"Open Access"** this thesis adopts the concept of open access stipulated in the Explanatory Note of the OECD Ministerial Declaration on Access to Research Data from Public Funding. The Explanatory Note defines "Open Access" as open international access to digital data resources which can be realised in various ways, depending on national practices and policies.[80] According to Annti Halonen, there are three aspects of openness in open access to data, which are: 1) technology openness (data is available on the web in machine readable and open standard format); 2) non-proprietary openness (data is seen as a common resource which should not be restricted to just a certain group of people; 3) legal openness (data must be licensed under such a licence that recognises the user's right to exploit data in a variety of way, including commercially).[81]

This thesis also adopts *Libre* Open Access,[82] over *Gratis* Open Access.[83] *Gratis* Open Access removes price barriers alone, while *Libre* Open Access removes price

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77 Peter Schroder, 'Towards International Guidelines for Access to Research Data From Public Funding' (CODATA, 2004), 1.

78 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

79 Suber, above n 1, 97.

80 Anonymous, 'Ministerial Declaration on Access to Research Data from Public Funding' (OECD, 2004).

81 Antti Halonen, 'Being Open About Data: Analysis of the UK Open Data Policies and Applicability of Open Data - Reports' (The Finnish Institute in London, 2012).

82 A *Libre* Open Access removes all permission barriers and unnecessary copyright and licensing restrictions. *Libre* Open Access allows anyone to have the rights to access and re-use the data, information, document, or journal, carried with the whole contents including text, data, and metadata, for whatever purpose without further explicit permission and without legal, social or technological restriction See Peter Suber, 'Open Access: "Gratis" and "Libre"' (2008) *Open Access News*, <http://openaccess.eprints.org/index.php?/archives/442-guid.html> (at 9 July 2010); Peter Suber, 'Open Access: "Strong" and "Weak"' (2008) *Open Access News*, <http://openaccess.eprints.org/index.php?/archives/399-guid.html> (at 8 July 2010).

83 A *Gratis* Open Access means users are free to access the digital content online, free of charge, but with a limited right to re-use, which does not include the right to re-publish, to re-sell and to create derivative works. Those rights are non-essential under *Gratis* Open Access and should be covered under different license such as Free Online Scholarship (FOS) license or Creative Commons (CC) licenses. See Stevan Harnad, 'Time to Update the BBB Definition of

barriers and at least some permission barriers.[84] Although the distinctions between *Libre* and *Gratis* Open Access have been drawn with respect to open access publication, the concept may also be applied in the context of enabling open access to and re-use of research data. Choosing between the two approaches of open access is of critical importance as it determines whether or not open access to research data should include the right to re-use.[85] *Libre* Open Access has been adopted in order to achieve the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

The adoption of *Libre* Open Access is consistent with the position of the three most authoritative texts on open access, i.e. the Budapest Open Access Initiative in 2002,[86] the Bethesda Statement on Open Access Publishing,[87] and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities,[88] both in 2003 (collectively known as "the BBB texts"). The BBB texts promote right of access and re-use that is open to all, unimpeded by permission barriers and unnecessary legal restraints.[89] The inclusion of the right to re-use as part of open access initiatives is also consistent with the position of the Open Knowledge Foundation which defines a piece of work, content or data as "open" if it satisfies the specified conditions of access, redistribution and reuse by anyone, subject only, at most, to attribution and share-alike obligations.[90]

Open Access' (2007) *American Scientist Open Access Forum*, <http://openaccess.eprints.org/index.php?/archives/311-Time-to-Update-the-BBB-Definition-of-Open-Access.html> (at 8 July 2010).

84 Suber, above n 1, 6, 8.

85 Michael Eisen attributes the *Libre* Open Access as "full open access", while stating that *Gratis* Open Access is in fact toll free access, but is not open access in a real sense. See Les Grivell, 'Access for All?' (2004) 5(3) *EMBO Reports* 222.

86 BOAI is an initiative under the auspices of the Open Society Institute to remove the barriers to open access to research and education. See 'Budapest Open Access Initiative' (2002) *Open Society Foundation*, <http://www.soros.org/openaccess/read> (at 22 February 2010).

87 The Bethesda Statement encourages faculty and grant recipients to publish their work according to the principles of the open access. See 'Bethesda Statement on Open Access Publishing' (2003) *Howard Hughes Medical Institute* <http://www.earlham.edu/~peters/fos/bethesda.htm#participants> (at 24 February 2010).

88 The Berlin Declaration supports open access through publishing in open access journals or self-archiving in open access repositories. See 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities', above n 18.

89 See 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities', above n 18. See also, 'Bethesda Statement on Open Access Publishing', above n 87.

90 See Deirdre Lee, 'Open Data Overview' (Digital Enterprise Research Institute National University of Ireland, 2011); Chris Yiu, 'A Right to Data: Fulfilling the Promise of Open Public Data in the UK' (Policy Exchange, 2012).

From the above definitions, **"Enabling Open Access to and Re-Use of Publicly Funded Research Data"** means releasing publicly funded research data in digital format through self-archiving in online open access repositories which are interoperable,[91] free of charge, in machine readable and open standard format for others to access and re-use for any lawful manner including commercially.[92] From the perspective of intellectual property law, releasing the research data in an open access repository does not grant the right to re-use by default. Enabling open access to and re-use of research data requires a licence to be granted which allows research data to be freely used, re-used and distributed by anyone down the chain of users. This permissive licence includes the right to copy, to distribute and to create derivative works. These rights are given not only to the first user, but also to the downstream users who access the research data deposited in an open access repository.[93]

It needs to be clarified that releasing research data in an online open access repository does not mean that the owners/creators/originators of the research data have waived their intellectual property rights. Suber points out that open access is not an attempt to reform, violate or abolish copyright as it is compatible with copyright law.[94] Therefore, the call for the provision of free, electronically accessible research outputs available on the internet should not be equated to a call to abandon

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91 The most useful open access repositories comply with the open access archives initiative (OAI) Protocol for Metadata (PMH), which makes separate repositories interoperable. See Suber, above n 1, 56.

92 There are 1071 online journal articles repositories, 74 online datasets repositories, 32 online software repositories and 31 online patents repositories worldwide registered under the Directory of Open Access Repositories. The Directory also provides a list of 689 online repositories that contain unpublished/pre-publication data, 394 repositories contain multi-media and audio-visual materials and 284 special item types repositories. See Directory of Open Access Repositories, 'Content Types in OpenDOAR Repositories - Worldwide' (2010) *University of Nottingham UK*, <http://www.opendoar.org/onechart.php?cID=&ctID=&rtID=&clID=&lID=&potID=&rSoftWareName=&search=&groupby=ct.ctDefinition&orderby=Tally+DESC&charttype=bar&width=600&caption=Content+Types+in+OpenDOAR+Repositories+-+Worldwide> (at 6 July 2010).

93 See Karl-Nikolaus Peifer, 'Open Access and (German) Copyright' in Open Access: Opportunities and Challenges - A Handbook (UNESCO, 2008) 50.

94 Suber, above n 1, 21. While research data that exist in the form of text, numbers, images or sounds may be eligible for copyright protection, there are situations where research data are not protected by copyright. This situation exists particularly where research data lack the requisite degree of originality. However, it is always difficult to draw a clear line between copyright and non-copyright data based on the originality criteria.

copyright.[95] Close examination of the BBB texts also found that despite the call for open access, the moral rights of the creator of the research outputs as stipulated under the intellectual property regime are required to be preserved.[96] Under an open access initiative, open access materials can be protected by intellectual property rights while being released as open access materials under open content licensing.[97]

Similarly, although the objective of enabling open access to and re-use of publicly funded research data is to release the research data for others to access and re-use, it will not extinguish any intellectual property rights in the research data. It does not amount to the data owner surrendering their intellectual property rights and should not be construed as an endorsement by the data owner or data creator of unethical, illegal or irresponsible use or any opportunistic behaviour such as plagiarism.[98] Hence, the objective of enabling open access to and re-use of research data should not be seen as an attempt to free research data from any legal rights or legal protection as some rights could still be reserved.[99]

1.4 MOTIVATION

The motivation behind this thesis is derived from the fact that, while public research funding agencies and public universities in many parts of the world have declared their strong support for open access, the trend has not been closely followed in Malaysia. To illustrate this point, none of the Malaysian public research funding agencies and the Malaysian public universities has become a signatory to the Berlin

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95 David Shulenburger, 'Scholarly Communications is Not Toxic Waste: Lessons Learned, Prepared for the Open Access to Knowledge in the Sciences and Humanities Conference, Max Planck Society, Harnack Haus, Berlin, October 2003' 4, <http://kuscholarworks.ku.edu/dspace/bitstream/1808/58/1/Scholarly%20Communications%20is%20Not%20Toxic%203.pdf> (at 9 October 2010).

96 Under the BBB texts, the authors of open access materials would still have control over the integrity of their work and the right to proper attribution, acknowledgement and citation. See, 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities', above n 18; 'Budapest Open Access Initiative', above n 86; 'Bethesda Statement on Open Access Publishing', above n 87.

97 Anne Fitzgerald, Neale Hooper and Brian Fitzgerald, 'Enabling Open Access to Public Sector Information with Creative Commons Licenses - The Australian Experience' in *Access to Public Sector Information : Law, Technology & Policy* (Sydney University Press, 2010).

98 Suber, above n 1, 23.

99 Chris Surridge, 'Free But Not Open?' (2007), <http://www.plos.org/cms/node/238> (at 7 July 2010).

Declaration on Open Access to Knowledge in the Sciences and Humanities.[100] Although the policies of most public research funding agencies and public universities in Malaysia encourage wide dissemination of research findings to the public and the world at large, none of the funding agencies or the universities mandates or encourages open access journal publishing or self-archiving in an open access repository.[101]

A search of research funders' open access policies on the Sherpa Juliet database revealed that not a single Malaysian institution has open access archiving, open access publishing or a data archiving policy.[102] A further search on the Registry of Open Access Repository Material Archiving Policies (ROARMAP) found that the Malaysian public research funding agencies are yet to have a policy which supports open access to and re-use of publicly funded research data.[103] A similar situation may be observed among the Malaysian public universities as none of them is among the 27 universities and institutes in the Asian region listed on ROARMAP as having in place an open access policy.[104]

Of the 20 public universities in Malaysia, only 9 have their institutional repositories registered under the Directory of Open Access Repositories (OpenDOAR), an authoritative directory of academic open access repositories.[105] A search of the

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100 'Signatories' (2010) *Open Access at the Max Planck Society*, <http://oa.mpg.de/openaccess-berlin/signatories.html> (at 12 July 2010).

101 See Ministry of Higher Education (MOHE) Application Guidelines for Fundamental Research Grant Scheme (2010 Amendment), Publication, [1.9.1]; Guidelines for the Application of Sports Research Grant, Publication, Intellectual Property Right and Royalty, [1.9.2]. See also, Universiti Malaya (UM) Research and Development Policy 2002, Vision, [3.1]; Universiti Putra Malaysia (UPM) Research Policy 2009, Dissemination of Research Output, [6.6(e)]; Universiti Malaysia Sarawak (UNIMAS) Research Policy (Version 7.0) 2006, The Governing Policy on Research, [3.1].

102 'Sherpa Juliet: Research Funders' Open Access Policies' (2009) *University of Nottingham*, <http://www.sherpa.ac.uk/juliet/> (at 21 June 2010).

103 See 'Summary By Type' *Registry of Open Access Repository Material Archiving Policies,*, <http://www.eprints.org/openaccess/policysignup/> (at 7 July 2010).

104 Those Asian countries (with number of institutional policy in bracket) are: Azerbaijan (1), China (7), India (8), Indonesia (6), Iran (1), Japan (1), Taiwan (1), Turkey (1), Vietnam (1). See *Registry of Open Access Repository Material Archiving Policies,*, <http://www.eprints.org/openaccess> (at 7 July 2010).

105 The Malaysian public universities with the institutional repositories registered under OpenDOAR are Universiti Kebangsaan Malaysia, Universiti Malaysia Perlis, Universiti Putra Malaysia, Universiti Sains Malaysia, Universiti Teknologi Malaysia, Universiti Teknologi MARA, Universiti Tun Hussein Onn Malaysia, Universiti Utara Malaysia and University of Malaya. See 'Directory of Open Access Repositories',

Sherpa Romeo database found that none of the Malaysian journal publishers, including the university publishers, clarifies their policies regarding the self-archiving of journal articles on the web and in open access repositories.[106] It is clear that the existing policies of public research funding agencies and public universities in Malaysia have not been developed with the objective of enabling open access to and re-use of publicly funded research data.[107] In the absence of a specific policy, releasing publicly funded research data in Malaysian public universities is merely voluntary and is not a matter of policy obligation.

As public research funding agencies in Australia, Austria, Belgium, Canada, the EU, Germany, Hungary, Ireland, the UK and the US either encourage or mandate open access to and re-use of publicly funded research data, rightfully public research funding agencies and public research institutions in Malaysia should reciprocate by introducing a similar policy. Open access cannot be limited to research created in developed countries, but must include research from developing countries (such as Malaysia).[108]

As far as publicly funded research in Malaysia is concerned, it was reported that between 2005 and 2010 the Malaysian Government allocated RM2.5 billion to the Ministry of Science, Technology and Innovation for the purpose of research funding.[109] In 2009, another RM200 million was allocated to the Ministry of Higher Education to fund research under the Fundamental Research Grant Scheme, which is only open to researchers in Malaysian public universities.[110] In the Malaysian Science and Technology Policy for the 21st Century, it was projected that research

<http://www.opendoar.org/find.php?search=&cllD=&ctID=&rtID=&cID=131&IID=&...> (at 18 February 2010).

106 'Sherpa-Romeo: List of All Publishers' *University of Nottingham*, <http://www.sherpa.ac.uk/romeo/browse.php?colour=all&fIDnum=|&letter=all> (at 21 July 2010).

107 See Universiti Malaya (UM) Research and Development Policy 2002, Vision, [3.1]; Universiti Putra Malaysia (UPM) Research Policy 2009, Dissemination of Research Output, [6.6.(e)]; Universiti Malaysia Sarawak (UNIMAS) Research Policy (Version 7.0) 2006, The Governing Policy on Research, [3.1].

108 Suber, above n 1, 97.

109 Anonymous, 'Mosti Perlu Dana Tambahan Rangsang Kreativiti, Inovasi Di Msia', *Bernama* (online), 15 May 2009, <http://www.bernama.com/bernama/v3/bm/news_lite.php?id=411267>; Anonymous, 'The Malaysian Agricultural Biotechnology Sector: A Frost & Sullivan Whitepaper' (Malaysian Biotechnology Corporation, 2009).

110 Department of Higher Education, 'Fundamental Research Grant Scheme ' (Ministry of Higher Education, 2009).

and development spending would increase to at least 1.5 percent of Gross Domestic Product (GDP) by year 2010. This is more than a three-fold increase in percentage terms compared with 0.49 percent of the country's GDP between 2001-2005.[111] From the above figures, it is clear that the Government through its ministries and agencies has allocated a substantial amount of public money to fund research, with the Malaysian public universities being allocated a special grant to conduct publicly funded research.

In terms of the technology and infrastructure required to provide online access to research data, the Malaysian Multimedia Super Corridor (MSC) which is part of the Malaysian ICT initiatives provides a world class ICT infrastructure, similar to the standard of the developed countries. The basic physical infrastructure of the MSC, including the telecommunications infrastructure with 2.5 gigabits per second asynchronous transfer mode-based backbone scalable to 10 gigabits per second in the MSC, was completed in 1999. This telecommunications infrastructure has enabled the transfer of voice, image and data, which is the main component of research data.[112] The Malaysian Institute Of Microelectronic Systems (MIMOS) grid computing centre which supports grid computing and multi-service networks in Malaysia provides the platform of the Malaysian cyberinfrastructure. The MIMOS Grid offers computing and collaborative resources on bioinformatics, product design, manufacturing, multimedia, financial analysis, defence and public safety, and natural disasters and climate studies. The Malaysian researchers and research organisations may utilise these computer-intensive tools, applications and data storage for advanced research.[113]

With regard to online connectivity, more than half of the population of Malaysia are internet users. As of June 2009 there were 16,902,600 Internet users throughout

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111 See Ministry of Higher Education Malaysia, 'National Higher Education Action Plan 2007-2010: Triggering Higher Education Transformation' (Government of Malaysia, 2007).

112 See 'Cybercities and Cybercentre' (2008) *Malaysian Multimedia Super Corridor*, <http://www.mscmalaysia.my/topic/Cybercities+&+Cybercentres> (at 13 March 2010); The National IT Council, 'Third Outline Perspective Plan-Developing Malaysia into a Knowledge-Based Economy' (MOSTI, 2009).

113 See 'Corporate Information About MIMOS' (2010) *Malaysian Institute Of Microelectronic Systems*, <http://www.mimos.my/about/corporate-information/> (at 13 March 2010); 'Grid Computing & Multi-Service Networks' (2010) *Malaysian Institute Of Microelectronic Systems*, <http://www.mimos.my/index61a3.html?sub=6&ma=29> (at 13 March 2010).

Malaysia, representing 65.72% of the total population of 25,715,819.[114] Malaysia's broadband penetration rate as at 2010 was 34%, an increase from 31.7% in 2009.[115] More recently, the fourth generation (4G) mobile internet network has been launched in Malaysia. The 4G technology has been designed from the start for faster access and transmission of data rather than phone calls.[116]

Without doubt, Malaysia has the capacity to implement open access initiatives which include enabling open access to and re-use of publicly funded research data in Malaysian public universities. It is ironic that a policy which supports open access to publicly funded research data is still missing in Malaysia, considering the fact that among the initiatives proposed by the Malaysian Science and Technology Policy to improve the diffusion of research findings is to facilitate the rapid and effective dissemination of information on research at national and international levels.[117] The growing number of countries with policies which support open access to publicly funded research data is a clear indication that now it is appropriate for public research funding agencies and public research institutions in Malaysia, including the Malaysian public universities to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data.

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114 Anonymous, 'Asia Marketing Research, Internet Usage, Population Statistics and Information' (Internet World Stats, 2009).

115 'Penetration Rate' (2010) *Malaysian Communications and Multimedia Commission*, <http://www.skmm.gov.my/facts_figures/stats/ViewStatistic.asp?cc=31200374&srid=50919742> (at 13 March 2010).

116 Asian Correspondent, 'Malaysia's YTL to Launch 4G network next month' (2010), <http://www.techwireasia.com/953/malaysias-ytl-to-launch-4g-network-next-month/> (at 14 October 2010).

117 The UN Economic and Social Commission for Asia and the Pacific (ESCAP) year 2009 report states that the number of fixed-line broadband subscribers and other internet users in Malaysia is 62.6 per 100 population which is the highest among other Asia-Pacific countries. The 8th Malaysian Plan forecasts that by 2015 household broadband would be at least 75%, which will deliver greater and faster internet service to most Malaysian households. See 'Science and Technology Policy ' (2009) *The National IT Council*, <http://www.nitc.my/index.cfm?&menuid=67> (at 26 March 2010); Anonymous, '2009 Statistical Yearbook for Asia and the Pacific ' (United Nations Economic and Social Commission for Asia and the Pacific, 2010); Economic Planning Unit, 'Executive Summary: 10th Malaysian Plan 2011-2015' (Government of Malaysia, 2010).

1.5 AIM AND OBJECTIVE

The objective of this thesis is to enable open access to and re-use of publicly funded research data in Malaysian public universities. In the absence of an open access policy for research data at the public research funding agencies and public universities, the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

In order to develop a policy to support such objective, six research questions have been formulated as follows:

1. Why should publicly funded research data become a subject of open access and re-use?;
2. What are the legal impediments to the objective of enabling open access to and re-use of publicly funded research data?;
3. To what extent do these legal impediments exist under the Malaysian laws?;
4. Have the legal impediments that exist under the Malaysian laws been resolved by the existing policies of Malaysian public universities?;
5. How did the policies which support open access to and re-use of publicly funded research data from other countries resolve the legal impediments?; and
6. How should a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities be developed?.

Based on the above research questions, this thesis:

i. investigates the external and internal benefits of enabling open access to and re-use of publicly funded research data;
ii. identifies the legal impediments to the objective of enabling open access to and re-use of research data;
iii. analyses the Malaysian laws underpinning the legal impediments to open access and re-use identified in this thesis;

iv. analyses the policies of Malaysian public universities dealing with the legal impediments to open access and re-use; and

v. compares the policies of public research funding agencies and universities from selected countries which support open access to and re-use of publicly funded research data.

The research findings are used to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

1.6 RESEARCH METHODOLOGY

The fundamental template of this thesis is legal research as it analyses the legal impediments to the objective of enabling open access to and re-use of publicly funded research data and the laws underpinning the legal impediments.[118] In conducting the legal research, the research methodology is purely qualitative. Though often considered as non-empirical and less rigorous compared to quantitative research methods, qualitative research is more suitable for legal research as it is more in-depth and flexible.[119] Such depth and flexibility are important as they give more room for critical analysis before proceeding to the development of a policy to support the objective of enabling open access to and re-use of publicly funded research data in the Malaysian public universities.

The methodology for this thesis is designed to answer the six research questions. A literature review (of both digital and non-digital libraries) was conducted in order to collect information relevant to answering the research questions. Being legal research, the collected information is drawn mostly from primary legal sources in the form of legislative texts comprising of statutes, codes and regulations. Also collected are primary legal sources in the form of non-legislative texts which include procedures, guidelines, reported and unreported case law. Apart from that, secondary

[118] For further explanation on legal research methodology, See Mark van Hoecke (ed), *Methodologies of Legal Research : What Kind of Method for What Kind of Discipline?* , European Academy of Legal Theory Monograph Series (Hart, Oxford, 2011).

[119] For further explanation on qualitative legal research, See Lisa Webley, 'Qualitative Approaches to Empirical Legal Research' in Peter Cane and Herbert Kritzer (eds), *The Oxford Handbook of Empirical Legal Research* (Oxford University Press, Oxford, UK, 2010) 926.

legal sources from law text books, law journals and law committee reports were also collected.[120] As there are research questions which require an answer from the perspective of the social sciences, information was also collected from the literature in the field of social sciences, comprising of academic publications (textbooks, journals, reports) and non-academic publications such as newspaper reports, websites and blogs.[121]

Analysis of the primary and secondary legal sources involved legal analysis (analysis of statutes, codes, regulations, law text books, law journals and law committee reports), doctrinal analysis (analysis of judicial decisions from reported and unreported case laws) and policy analysis (analysis of policies, procedures and guidelines).[122] These legal, doctrinal and policy analyses apply a positive analysis approach, which asks 'what are the governing law and policy?. The positive analysis approach requires the laws and the policies which underpin or deal with the legal impediments to be critically analysed. Besides that, a normative analysis approach, which asks 'what the policy ought to be', was also applied in the research.[123] The normative analysis approach which requires analysis of both the primary and secondary legal sources is important as the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

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120 For further explanation on primary legal source and secondary legal source materials, See Robert Watt and Francis Johns, *Concise Legal Research* (Sixth ed, The Federation Press, Sydney, 2009).

121 For further explanation on multidisciplinary qualitative research involving law and social sciences, See Susan Bibler Coutin, 'Qualitative Research in Law and Social Sciences' (Paper presented at the The National Science Foundation's Workshop on Interdisciplinary Standards for Systematic Qualitative Research, Washington DC, USA, 19-20 May 2005).

122 For further explanation on legal analysis, doctrinal analysis and policy analysis, See Neil Komesar, 'In Search of a General Approach to Legal Analysis: A Comparative Institutional Alternative' (1981) 79(7) *Michigan Law Review* 1350; Emerson Tiller and Frank B Cross, 'What is Legal Doctrine' (2005) 41 *Public Law and Legal Theory Papers*, <http://law.bepress.com/cgi/viewcontent.cgi?article=1003&context=nwwps> (at 26 May 2011); and Mark Tushnet, 'Legal Scholarship: Its Causes and Cure' (1981) 90(5) *The Yale Law Journal* 1205.

123 For further explanation on the positive and normative approach of legal analysis, See Jeffrie G Murphy and Jules L Coleman, *The Philosophy of Law: An Introduction to Jurisprudence* (Westview Press, Boulder, Co, 1989); Brian Bix, *Jurisprudence: Theory and Context* (Fifth ed, Sweet & Maxwell, London, 2006).

1.7 SIGNIFICANCE OF THIS THESIS

Since the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities, the significance of this thesis is established by showing that enabling open access to and re-use of publicly funded research data in Malaysian public universities requires a policy to be developed.

To begin with, advocates of open access such as Alma Swan have long identified the need for a clear legal policy if the objective of open access is to be successfully achieved.[124] In terms of open access to data policy, Uhlir and Schroder,[125] Moskovkin,[126] and Arzberger et al,[127] argue that a successful data access and re-use regime requires a comprehensive framework of policies and procedures based on a complete set of supporting principles and guidelines. Reference to the need for the public research funding agencies and the universities to develop a policy for data access and data sharing was also made by Denise Lievesley, President of International Statistical Institute in her keynote address at the plenary session of the European Commission's Inspire Conference 2009.[128] Chris Armbruster, a Research Associate at Max Planck Digital Library and the Executive Director of Research Network 1989, argues that the universities and public research organisations need a new policy that distinguishes the dissemination of research results in the form of articles from other kinds of publications (eg monographs, textbooks) and that mandates non-exclusive licensing for the digital dissemination of research articles. [129]

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124 Alma Swan et al, 'Developing a Model for e-Prints and Open Access Journal Content in UK Further and Higher Education' (2005) 18 *Learned Publishing* 30.

125 Paul Uhlir and Peter Schroder, 'Open Data for Global Science' in Brian Fitzgerald (ed), *Legal Framework for e-Research: Realising the Potential* (Sydney University Press Sydney, 2008) 216-217.

126 VM Moskovkin, 'Institutional Policies for Open Access to the Results of Scientific Research' (2008) 35(6) *Scientific and Technical Information Processing* 269.

127 Peter Arzberger et al, 'An International Framework to Promote Access to Data' (2004) 303 *Science* 1777.

128 Denise Lievesley, 'Information is Power: Overcoming Obstacles to Data Sharing' (2009), <http://inspire.jrc.ec.europa.eu/events/conferences/inspire_2009/presentations/plenary/inspire2009_lievesley.pdf> (at 2 October 2010).

129 Chris Armbruster, 'Cyberscience and the Knowledge-Based Economy: Open Access and Trade Publishing: From Contradiction to Compatibility With Nonexclusive Copyright Licensing' (2008) (12) *International Journal of Communications Law and Policy* 17.

At the governmental level, the OECD Ministers in adopting a Declaration on Access to Research Data from Public Funding, urged the OECD to take steps towards proposing legal principles and guidelines on open access to and re-use of research data from public funding, by taking into account possible restrictions related to security, property rights and privacy.[130] The same position has been taken by the European Commission which sees its role as policy making body which co-ordinates the framework of open access policy among its member states.[131]

Arguments on the need for a policy to support open access to and re-use of publicly funded research data were also made by Prof Anne Fitzgerald and Prof Brian Fitzgerald of the Open Access to Knowledge Law Project (OAK Law).[132] OAK Law's first research project, "Creating a Legal Framework for Copyright Management of Open Access Within the Australian Academic and Research Sector", analysed the copyright law framework needed to open up access to the research outputs of the Australian academic and research sector such as datasets, articles and theses. The report called on the Australian research and funding institutions to consider their commitment to open access and to articulate their commitment in clear policies and copyright management frameworks. The report argued that from the legal perspective, it is not possible to establish any kind of open access system simply by default. Rather, development of an open access system can only successfully occur through deliberate policy construction and active copyright management.[133]

The need for a policy to support open access to and re-use of research data is further argued by Fitzgerald et al in 'The Future of Data Policy". Fitzgerald et al argue that to be effectively implemented, the open access movement must be supported by

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130 OECD Committee for Scientific and Technological Policy, above n 42.

131 Peter Zilgavis, 'Towards an Open Access Policy in European Research' (2009) *European Commmission Activities in the Field of Open Access to Research Publication*, <http://www.slideshare.net/KnowledgeExchange/towards-an-open-access-policy-in-european-research> (at 20 January 2010).

132 Prof Anne Fitzgerald and Prof Brian Fitzgerald are the Principal Supervisor and Associate Supervisor of this thesis.

133 Brian Fitzgerald et al, 'Creating a Legal Framework for Copyright Management of Open Access within the Australian Academic and Research Sector' in Brian Fitzgerald (ed), *Legal Framework for E-Research: Realising the Potential* (Sydney University Press, Sydney, 2008) 283.

national policies and laws.[134] In "Legal Implications Surrounding Data Access, Sharing and Reuse", Fitzgerald et al reiterate their view on the need for the academic and research institutions sector to have in place a regulatory framework which facilitates access to and re-use of research data. They argue that to achieve seamless access to data it is necessary not only to adopt appropriate technical standards, practices and architecture, but also to develop legal frameworks that facilitate access to and use of research data.[135]

The need for a policy is once again argued by Fitzgerald et al in "Creating a Legal Framework for Copyright Management of Open Access Within the Australian Academic and Research Sector". The part which specifically underlines the need for a policy is hereby reproduced below:

> these policies should deal with the legal impediments to making copyright material openly accessible, including determining who owns copyright, how to obtain necessary permissions from copyright owners and how to license material in a way that grants the appropriate rights but retains the appropriate controls. Before implementing a copyright management policy for the provision of access to and reuse of research, each institution should develop and publish its policy on open access, clearly enunciating its objectives and interests in providing materials by this means.[136]

All the above arguments point towards the conclusion that it is necessary to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

1.8 DELIMITATIONS

This thesis focuses on publicly funded research data while keeping in mind that there are other types of data such as administrative, statistical and geospatial data which are created with Government funding. In selecting publicly funded research

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134 Fitzgerald, Fitzgerald and Papalardo, 'The Future of Data Policy' in Tony Hey, Stewart Tansley and Kristin Tolle (eds), above n 8, 201.

135 Anne Fitzgerald, Kylie Pappalardo and Anthony Austin, 'Understanding the Legal Implications of Data Sharing, Access and Reuse in the Australian Research Landscape' in Brian Fitzgerald (ed), *Legal Framework for E-Research: Realising the Potential* (Sydney University Press, 2008) 162.

136 Fitzgerald et al, above n 133, 284.

data as the focus of study, this thesis shares the argument made by Bollier that governments, public research funding agencies and the recipients of publicly funded research grants have a fiduciary duty to the taxpayers of the country.[137] In this regard, Bollier quotes from Merges in "Social Philosophy and Policy" as follows:

> Those who produce scientific knowledge, understand that the community always has extensive claims on it, because without shared knowledge, research techniques, and even biological materials, there would often be no results, no progress, and hence nothing to argue about... a lab that always 'takes' research results, but never 'gives' in return is like a municipality that pumps water as fast as it can, at the expense both of its neighbours and ultimately of rational water use.[138]

Since a substantial amount of research data around the world, including Malaysia, is generated through public funds, there is a plausible moral argument to be made for the idea that the data from such research should be made freely available to the public that funds it.[139] It is argued that, if taxpayer monies produce the research, then the taxpayers should have access to the research results.[140]

The above argument explains why most calls in favour of open access to research data are directed at research data underwritten by public funds. Houghton and Vickery, in a report published by the OECD in 2005, argue that public funding is very important in research activities that generate research data and access to public and government funded research content is a crucial issue.[141] According to Lievesley, the availability of publicly funded research data should be restricted only by legitimate considerations of national security restrictions, protection of confidentiality and privacy; intellectual property rights and time-limited exclusive use by principal investigators.[142] The UK Data Archive observes that, the data management and sharing environment has evolved such that research funding agencies place sharing of research data ever higher amongst their priorities, as

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137 David Bollier, 'The Enclosure of the Academic Commons' (2002) 88(5) *Academe* 19.

138 Robert P Merges "Social Philosophy and Policy" in David Bollier, above n 137.

139 See Wijayananda Jayaweera, 'Whose Knowledge?' (2001) 28(1) *Media Asia* 22; Rick Anderson, 'Author Disincentives and Open Access' (2004) 30(4) *Serials Review* 288.

140 Christine L Borgman, 'Research Data: Who Will Share What, With Whom, When and Why?' (Paper presented at the Fifth China-North American Library Conferences, Beijing, 8-12 September 2010).

141 Houghton and Vickery, above n 7.

142 See Lievesley, above n 128.

reflected in their data sharing policies and the demand for data management plans in research applications.[143]

Next, the Malaysian public universities have become the focus of study despite full awareness that there are other recipients of publicly funded research grants from academic, non-academic and private sectors in Malaysia. By selecting the Malaysian public universities as the focus of study, this thesis is narrowed down by sectorial, institutional, organisational and territorial limits. These limitations are hereby justified below.

Firstly, in terms of the sectoral limitation, the Malaysian public universities operate within the academic sector. The selection of the academic sector over the non-academic sector is best explained by the fact that, unlike researchers in the non-academic sector, researchers in the academic sector usually work in an atmosphere of openness, in which they share their knowledge, data and research results.[144] As argued by Shulman, sharing of knowledge and open exchange of information is paramount in educational and academic research in order to test the veracity of new findings, to propagate new knowledge and to disseminate the knowledge to students and colleagues.[145]

Within the academic sector, universities have increasingly been viewed as the fountain of knowledge and the engines of economic growth, fuelled by the technological innovations they foster.[146] A survey conducted in 2002 by a group of researchers found that the most salient contribution of universities is through the production of information.[147] Yochai Benkler also agrees that university research has several characteristics that give it a distinct role and quite different from non-academic research. According to Benkler, the academician in the university is

143 Veerle Van den Eynden et al, 'UK Data Archive: Managing and Sharing Data - Best Practice for Researchers' (University of Essex, 2011).

144 Bart Verspagen, 'University Research, Intellectual Property Rights and European Innovation Systems' (2006) 20(4) *Journal of Economic Surveys* 616.

145 Seth Shulman, Trouble on The Endless Frontier: Science, Invention and the Erosion of the Technological Commons (New America Foundation and Public Knowledge, Washington DC, 2002) 3, 20.

146 Ibid 6.

147 Bhaven N Sampat, 'Patenting and US Academic Research in the 20th Century: The World Before and Afther Bayh-Dole' (2006) 35 *Research Policy* 774.

dedicated to internal system values such as the ideas of academic freedom and intellectual discipline which is far removed from market enticement of the non-academic sector.[148] That explains why many contributors to open access publications and repositories are academic members of faculty instead of non-academic researchers and researchers from the commercial sector or industry.

Further, the academic and non-academic sectors produced scientific knowledge with different objectives. The non-academic sector (in particular commercial and industry) is much more focused on exploiting and appropriating research results (through patents, secrecy etc) to the maximum.[149] In contrast, the traditional missions of academic research have always been education and transfer of knowledge by diffusing knowledge without any specific direct economic return.[150] Hence, it is well recognised that academic research is an important source of new knowledge, especially in the areas of science and technology.[151] Academic researchers, particularly in universities, are expected to contribute to the free and open sharing of knowledge and information.[152]

Due to expectations that researchers in the academic sector should openly share knowledge and information, the research institutions in the academic sector should take a leading role. Universities in particular should take this leading role ahead of non-academic research institutions in enabling open access to and re-use of publicly funded research data in Malaysia.

Secondly, in terms of institutional limitations, the selection of Malaysian public universities over other public research institutions in Malaysia is partly due to the researcher's position as an academic staff member at a Malaysian public university.

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148 Yochai Benkler, 'The University in the Networked Economy & Society' (2008) (November/December) *Educause* 62.

149 Vittorio Chiesa and Andrea Piccaluga, 'Exploitation and Diffusion of Public Research: The Case of AcademicSpin-Off Companies in Italy' (2000) 4 *R&D Management* 329.

150 Sampat, above n 147, 784.

151 Ajay Agrawal, 'University-to-Industry Knowledge Transfer: Literature Review and Unanswered Questions' (2001) 4 *International Journal of Management Reviews* 285.

152 Peter D Blumberg, 'From "Publish or Perish" to "Profit or Perish": Revenues from University Technology Transfer and the Ss. 501(c)(3) Tax Exemption' (1996) 145(1) *University of Pennsylvania Law Review* 91.

Although open access initiatives have general relevance for all recipients of public research funding, they are especially relevant for universities compared to other public research institutions. This observation is supported by the fact that the majority of the scholarly works on open access have focused on universities. For example, the works and arguments of Kapczynkski et al,[153] Dov Greenbaum,[154] Litan et al,[155] Powell and Owen-Smith[156] and Argyres and Liebeskind,[157] Mowery and Sampat[158] (just to cite a few) which support Open Access/Open Content Licensing over exclusive proprietary regime, all focus on universities.

Christie et al in distinguishing between universities and other public research institutions, argue that university research is different from research conducted in other institutions as the latter focuses solely upon research, while university research focuses on both teaching and research.[159] Andre Oosterlinck explains that the traditional function of the university is to create knowledge through research, disseminate knowledge through teaching and public outreach and preserve knowledge through its library systems.[160] In this regard, Oosterlinck argues that modern universities are no longer living in splendid isolation. They have a responsibility to society, which expects something in return for the privileges and special place it has accorded to universities. In light of this expectation, besides

153 Amy Kapczynski et al, 'Addressing Global Health Inequities: An Open Licensing Approach for University Innovations' (2005) 20 *Berkeley Technology Law Journal* 1031.

154 Dov Greenbaum, 'Academia to Industry Technology Transfer: An Alternative to the Bayh-Dole System for Both Developed and Developing Nations' (2009) 19 *Fordham Intellectual Property, Media and Entertainment Law Journal* 311.

155 Robert E Litan, Lesa Mitchell and EJ Reedy, 'Commercializing University Innovations: A Better Way' (2007) *Working Paper* 1, <http://sites.kauffman.org/pdf/nber_0407.pdf> (at 15 January 2010).

156 Walter W Powell and Jason Owen-Smith, 'Universities and the Market for Intellectual Property in the Life Sciences' (1998) 17(2) *Journal of Policy Analysis and Management* 253.

157 Nicholas S Argyres and Julia Porter Liebeskind, 'Privatizing the Intellectual Commons: Universities and the Commercialization of Biotechnology' (1998) 35 *Journal of Economic Behavior & Organization* 427.

158 David C Mowery and Bhaven N Sampat, 'Universities in National Innovation Systems' (2005), <http://stahl.vwl.uni-mannheim.de/inhalt/veranstaltungen/unterdokumente/veranstaltungen_im_fss_2007/seminar_innovation_economics/course_materials/ms_uninis_wp.pdf> (at 25 March 2010).

159 Andrew F Christie et al, 'Analysis of the Legal Framework for Patent Ownership in Publicly Funded Research Institutions' (Commonwealth of Australia Department of Education, Science & Training, 2003) 70.

160 A Oosterlinck and KU Leuven, 'Knowledge Management in Post-Secondary Education: Universities' (2002), < www. oecd/dataoecd/46/21/2074921. pdf, > (at 12 April 2010).

knowledge creation, knowledge dissemination has become the second characteristic of a modern university.[161]

In terms of knowledge dissemination, Monotti and Ricketson argue that universities are different from other kinds of institutions as they are the guardians of public knowledge and the intellectual commons.[162] Chris Greer also believes that universities are in a unique position compared to other public research institutions. According to Greer, the mission of universities in the sharing of information and knowledge dissemination is consistent with the ideal of open access.[163] John Willinsky comments that, while an open access approach represents a commitment to a larger public sphere which extends well beyond the university, the university nevertheless remains as the primary institutional force in sustaining the open access agenda.[164]

In a submission to the inquiry into improving access to Victorian Public Sector Information and Data, Deakin University submitted that access to research data and information is fundamental to the aims and aspirations of universities, particularly when it underpins scholarly research and innovation.[165] The unique role of universities as institutions traditionally centered around knowledge dissemination is fundamental to the Australian Federal Court's decision in *University of Western Australia v Gray*.[166] The Court recognised that universities are created to serve public purposes and there was no evidence to suggest that commercial activities supplant the traditional public function as an institution of higher education in favour of the pursuit of commercial objectives.[167]

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161 Ibid.

162 Ann Louise Monotti and Sam Ricketson, *Universities and Intellectual Property: Ownership and Exploitation* (Oxford University Press, New York, 2003) 43.

163 Chris Greer, 'The Fifth Dimension' in Brian Fitzgerald (ed), *Legal Framework for E-Research: Realising the Potential* (Sydney University Press, Sydney, 2008) 20.

164 Willinsky, above n 3, 10.

165 Anonymous, 'Submission to the Inquiry Into Improving Access to Victorian Public Sector Information and Data' (Deakin University, 2008).

166 University of Western Australia v Gray (No 20) [2008] FCA 49.

167 See Ann Monotti, 'Rights in University Inventions: UWA v Gray' (2010) (1/10) *Law Matters* 6, <http://www.law.monash.edu.au/law-matters/final-lm-april-2010.pdf> (at 7 June 2010).

Since it has been established by previous scholars that universities have become the main target of open access initiative, it is hereby justifiable for this thesis to focus on universities as the institution under study.

Thirdly, in terms of the organisational limitation, the Malaysian public universities have been chosen over private universities as the organisations under study. While it has to be admitted that the Malaysian private universities far outnumber the public universities, the majority of them do not receive public funding. Apart from that, the majority of the local private universities mainly focus on producing undergraduates and are not involved in research and development. The only exceptions are the Multimedia University (MMU), the Petronas Technology University (UTP), and Universiti Tenaga Nasional (UNITEN), which are actively involved in research activities, but still pale in number compared to the public universities. With respect to foreign universities which operate as private universities in Malaysia, such as Monash University, Swinburne University of Technology, Curtin University of Technology and Nottingham University, while their academicians are also eligible for the Malaysian government's research grant, the statistics show that not many of them receive public research grants.[168]

In contrast, the Malaysian public universities are highly dependent on public funding for their operational costs as well as for their research projects. Therefore it is not surprising to learn that the Malaysian public universities combined, stand as the largest recipient of publicly funded research data grants compared to the private universities.[169] As the largest recipients of the funds, it is essential for the Malaysian public universities to share publicly funded research data, so that the research data can be used to the benefit of the public.[170] By enabling open access to and re-use of publicly funded research data in the Malaysian public universities, a substantial part

168 Between 2006 – 2009, there were only 59 publicly funded research data projects undertaken by the foreign-based universities in Malaysia. See 'e-Science Fund' (2010) *Ministry of Science Technology and Innovation*, <http://ernd.mosti.gov.my/eScience/Download/Listofrecipient_2006.pdf> (at 10 May 2010).

169 Between 2006-2009, the Malaysian public universities received 2323 research grants from the Ministry of Science and Innovation compared to 235 research grants received by the private universities within the same period of time. See 'e-Science Fund', above n 168.

170 Ammon J Salter and Ben R Martin, 'The Economic Benefits of Publicly Funded Basic Research: A Critical Review' (2001) 30 *Research Policy* 509.

of publicly funded research data from Malaysia which is currently locked-up, could be released to the public and to the world at large.

Fourthly, there is a territorial limitation arising from the selection of Malaysia as the only country for the study. It is difficult to refute the fact that there are many other countries, developed and developing alike, which are yet to have in place a policy which enables open access to and re-use of publicly funded research data.

Malaysia is a suitable case study as, unlike the US, the UK, Australia and many other countries, the Malaysian federal government is yet to introduce freedom of information laws. The absence of such laws indicates that the rights to access and re-use public data and information are still missing in this country. Further, less than two years ago Malaysia introduced the *Personal Data Protection Act 2010,* which so far has not been examined in the context of enabling open access to and re-use of research data and information. In addition, since 2006 the Malaysian Government has adopted an Intellectual Property Commercialisation Policy for Publicly Funded Research Data which is modeled on the US Bayh-Dole Act.[171] Like the Bayh-Dole Act, the policy creates default ownership of patent rights for universities and encourages academic patenting and commercial licensing of academic patents. This law and policy may have legal implications for the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.[172]

Despite the above limitations, it is still possible for the findings from the legal and policy analysis, as well as the policy developed from it, to be generalised to other sectors, institutions or organisations in Malaysia. As open access is a global movement, the policy developed by this research may also be applied by the public universities of other countries. Potentially, the policy could also be applied to the research funded by non-profit or philanthropic organisations. This extension is possible due to the fact that non-profit and philanthropic organisations share the common objective of funding research for the public good. Enabling open access to

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171 See Intellectual Property Commercialisation Policy for Research & Development (R&D) Projects Funded by the Government of Malaysia 2009.

172 According to Boettiger and Bennett, the Bayh-Dole Act has inadvertently contributed to restricted access to "upstream research tools". See Sara Boettiger and Alan Bennett, 'The Bayh-Dole Act: Implication for Developing Countries' (2006) 46(2) *Idea* 261.

and re-use of research data is undoubtedly one of the best ways of achieving their noble objectives.

1.9 THESIS OUTLINE

Being a doctoral dissertation, this thesis adopts the traditional thesis approach which is structured in a chapter-based (or monograph) format.[173] This thesis has nine chapters (the introduction, investigation of the external benefits, investigation of the internal benefits, the legal impediments, the legal analysis, the policy analysis, the comparative analysis, the policy development and the conclusion). Each of these chapters has its specific purpose which revolves around the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

Chapter 1 introduces the background, defines key terms/concepts, the motivations and the framework of this thesis. In terms of the framework, this chapter introduces its aim, objective and the research questions. The research methodology used to achieve the answers to the research questions is also introduced in this chapter. In order to establish the significance of this thesis, this chapter cites various arguments which call upon a policy to be formulated. While the significance of this thesis is firmly established, this chapter also explains and justifies the focus of this thesis as well as the sectoral, institutional, organisational and territorial limitations arising from the scope of the study.

The next seven chapters (Chapter 2 to Chapter 8) are designed to answer the six research questions put forward in this thesis.

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[173] A traditional thesis is structured in a chapter-based format. The body of the thesis is generally composed of chapters describing an overall introduction, literature review, methodology section, analysis and results, discussion, conclusions and references. It is also common practice in some disciplines to have an overall introduction and literature review which are then followed by chapters that are encapsulated projects. These are then followed by a general discussion the conclusions and references. See Queensland University of Technology Summary of Thesis Guidelines. See also, Concordia University School of Graduate Studies, 'Types of Theses' (2011) 9, <http://gpe.concordia.ca/documents/types_thesis.pdf> (at 7 October 2011).

Chapter 2 and **Chapter 3** answer the first research question: Why should publicly funded research data become a subject of open access and re-use?

Chapter 2 investigates the external benefits of enabling open access to and re-use of publicly funded research data. It examines various theories (economic, innovation, public good, social justice and human rights theories) underlining the benefits of enabling open access to and re-use of publicly funded research data to the society at large. The arguments by supporters of open access on the external benefits under these theories are also highlighted by this chapter. This chapter summarises its findings by arguing that enabling open access to and re-use of publicly funded research data in Malaysian public universities is strongly justified as it provides various benefits to the society at large.

Chapter 3 investigates the internal benefits of enabling open access to and re-use of publicly funded research data. It investigates seven (7) benefits for universities: overcoming the accessibility problem faced by university researchers; increasing the visibility, citation and impact of university research; detecting scientific fraud by university researchers; avoiding unnecessary duplication and repetition of research efforts; facilitating university participation in research collaboration; preserving the academic mission of public universities; and promoting the norms of open science among university researchers. This chapter summarises its findings by arguing that enabling open access to and re-use of publicly funded research data provides various internal benefits to the Malaysian public universities.

Chapter 4 answers the second research question: What are the legal impediments to the objective of enabling open access to and re-use of publicly funded research data? This chapter identifies eleven (11) legal impediments arising from: intellectual property protection; ambiguity about data ownership; data owner's exclusive rights; the restrictive scope of the legitimate use; complex and lengthy licensing procedures; an author's moral right of integrity; non-disclosure of confidential research data; the right to informational privacy; protection of national security; novelty requirements in patent law; and lack of a legal duty to ensure data quality. This chapter summarises its findings by arguing that these legal impediments could impede the

objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

Chapter 5 answers the third research question: To what extent do these legal impediments exist under the Malaysian laws? This chapter analyses the Malaysian laws, comprising both the statutes and case laws underpinning copyright, confidentiality, privacy, national security, patents and torts so far as they relate to the legal impediments identified in this thesis. This chapter summarises its findings by arguing that the legal impediments to open access and re-use identified in Chapter 4 also exist under the Malaysian laws.

Chapter 6 answers the fourth research question: Have the legal impediments that exist under the Malaysian laws been resolved by the existing policies of Malaysian public universities? This chapter analyses the intellectual property, research, repository, confidentiality, privacy, security and commercialisation policies of Malaysian public universities which deal with the legal impediments. This chapter summarises its findings by arguing that a majority of the legal impediments (9 out of 11) have not been resolved by the existing policies of Malaysian public universities.

Chapter 7 answers the fifth research question: How did the policies which support open access to and re-use of publicly funded research data from other countries resolve the legal impediments? This chapter analyses and compares the policies of public research funding agencies and universities from selected countries (i.e. Australia, the UK and the US) which support open access to and re-use of publicly funded research data. This chapter summarises its findings by arguing that the legal impediments identified in this thesis are not fully resolved by the policies under comparison.

Chapter 8 answers the final research question: How should a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities be developed?. This chapter develops a policy to support the objectives of enabling open access to and re-use of publicly funded research data in Malaysian public universities. Besides a policy, procedures to implement the policy and the guidelines on the best practices to resolve the legal

impediments are also developed. This chapter highlights the unique/special features of the policy compared to other policies currently in existence.

Chapter 9 concludes by synthesising this thesis, summarising its findings and recommendations and making suggestions for future research.

This outline merely provides a brief insight of all the chapters embodying this thesis. An elaborate explanation of the purpose, the scope and where relevant, the methods of analysis and the selection of samples of analysis could be found in the "Overview" section at the beginning of each chapter of this thesis.[174]

[174] See the "Overview" sections of Chapter 2 to Chapter 8 of this thesis.

CHAPTER 2
INVESTIGATING THE EXTERNAL BENEFITS OF OPEN ACCESS AND RE-USE

2.1 OVERVIEW

This chapter is the first part of a two-chapter series which serves to answer the first research question i.e. Why should publicly funded research data become a subject of open access and re-use? Answering this research question is very important as it could provide a strong justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. A report on open data published by the Finnish Institute states that there are two categories of benefit that flow from open access to and re-use of research data. The first category is the external benefit i.e. the benefit to the society at large. The second category is the internal benefit i.e. the benefit to the organisation which provides open access to and re-use of data.[175]

This chapter investigates the external benefits of enabling open access to and re-use of publicly funded research data. To answer the research question, five theories underlining various benefits of enabling open access to and re-use of publicly funded research data are examined. Apart from examining the theories, this chapter also highlights the arguments on the benefits of open access and re-use under these theories. The external benefits underlined by these theories and their supporting arguments provide a strong justification for the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

2.2 BENEFITS TO THE SOCIETY AT LARGE

2.2.1 Benefit Under Economic Theory

There are two economic theories underlining the benefits of enabling open access to and re-use of research data.[176] Both theories are inspired by Schumpeter's theory of

[175] Antti Halonen, above n 81.

[176] The classical economic theory holds that people are intrinsically selfish and will not do anything to help others – such as providing information products –unless they are given

innovation and economic development.[177] The first theory is known as the Evolutionary Economic Theory which has gained significance presence since the early 1950s.[178] The evolutionary economists believe that the growth of knowledge assumes central importance as knowledge is the building block of the economic system.[179] They argue that an increase in the stock of useful knowledge and the extension of its application becomes the essence of modern economic growth. Hence, if the economic goal is to grow the wealth of nations and societies, then it will inevitably involve growing knowledge.[180] From evolutionary economists' perspective, knowledge grows and is reproduced by learning and by diffusion to other individuals and firms.[181] In this regard growth of economy is made possible by interactive and open knowledge, as when knowledge grows, societies progress.[182]

Another economic theory which underlines the benefits of enabling open access to and re-use of research data is the New Growth Theory (NGT). The NGT was developed by Romer and is founded on ideas about how knowledge impacts economic growth.[183] The NGT reflects a novel attempt to understand the role of knowledge and technology in driving productivity and economic growth in a knowledge based-economy.[184] The NGT is premised upon the importance of knowledge in economic growth, which is considered as the raw material, with a

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incentive and remuneration. See Francis Heylighen, 'Why is Open Access Development so Successful? Stigmergic Organization and the Economics of Information' in B Lutterbeck, M Barwolff and RA Gehring (eds), *Open Source Jahrbuch* (Lehman Media, 2007).

177 Fulvio Castellaci, 'Evolutionary and New Growth Theories. Are They Converging?' (2007) 21(3) *Journal of Economic Surveys* 586.

178 See Witold Kwasnicki, *Knowledge, Innovation and Economy: An Evolutionary Exploration* (Edward Elgar Publishing Ltd., Cheltenham, UK, 1996) xi; Witold Kwasnicki, 'Roots of Evolutionary Economics' (1996), <http://prawo.uni.wroc.pl/~kwasnicki/todownload/evolutionary%20economics.pdf> (at 6 May 2010); Jan G Lambooy, 'Knowledge and Urban Economic Development: An Evolutionary Perspective' (2002) 39 *Urban Study* 1025.

179 See Ron Boschma and Ron Martin, 'Editorial: Constructing an Evolutionary Economic Geography' (2007) 7 *Journal of Economic Geography* 537; Jason Potts, 'Evolutionary Economics: An Introduction to the Foundation of Liberal Economic Philosophy' (2003) *Discussion Paper No 324* 1, <http://www.uq.edu.au/economics/abstract/324.pdf> (at 6 May 2010); Kurt Dopfer and Jason Potts, 'Evolutionary Realism: A New Ontology for Economics' (2004) 11(2) *Journal of Economic Methodology* 198.

180 Potts, above n 179, 13.

181 Lambooy, above n 178, 1025.

182 Potts, above n 179, 9.

183 Wilfred Dolfsma, Knowledge Economies: Innovation, Organization and Location (Routledge, Oxon, 2008) 4.

184 Anonymous, 'The Knowledge-Based Economy' (Organisation for Economic Co-Operation and Development, 1996) 7.

greater emphasis on adding value to the knowledge.[185] In the NGT, knowledge is treated as an addendum to the traditional economic resources of land, labour and capital.[186]

In treating knowledge as the raw material and one of economic resources, the NGT stipulates that, in addition to knowledge investments, knowledge distribution through formal and informal networks is essential to economic performance.[187] The formal and informal networks of knowledge distribution are also known as the Network Economy, which emerged right after the decline of the Industrial Economy.[188] In the Network Economy, knowledge and information have become the most important productive factors and the production, storage, distribution, and processing of knowledge and information is being decentralized, whereby information becomes shareable and accessible by all.[189] In the Network Economy, open source and open access are important concepts to create new opportunities for various segments of the population in the Network Economy.[190]

From the examination of the Evolutionary Economic Theory and the NGT, it could be assumed that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. Scientific and technological knowledge is considered the most important raw material for economic growth and the publicly funded research has become one of the main sources of new scientific and technological knowledge.[191] As most nations have evolved into knowledge based-economies, open access to and re-use of knowledge and information have become the central attention of the economists.[192] In a knowledge-based economy, diffusion

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185 See Walter W Powell and Kaisa Snellman, 'The Knowledge Economy' (2004) 30 *Annual Review of Sociology* 200; Jon-Arild Johannessen, Bjorn Olsen and Johan Olaisen, 'Aspects of Innovation Theory Based on Knowledge-Management' (1999) 19 *International Journal of Information Management* 123.

186 Philip Cheng, Brian Hilton and Chong Choi, 'Knowledge and Developing Economies' (2005) 48(3) *Development* 88.

187 Vernon W Ruttan, 'The New Growth Theory and Development Economics: A Survey' (1998) 35(2) *Journal of Development Studies* 6; Anonymous, above n 184, 7.

188 Benkler, above n 148, 60.

189 Ibid.

190 Don Flournoy, Rolland LeBrasseur and Sylvie Albert, 'The Case for Open Access Networks' (2009) 5(1) *International Journal of Technology and Human Interaction* 8.

191 Chiesa and Piccaluga, above n 149, 329.

192 See Anonymous, 'Moving Toward Knowledge-Based Economies: Asian Experiences' (Asian Development Bank, 2007) 20; Candice Stevens, above n 192, 8; Mike Cowey, 'Knowledge Economy - Fact or Fad?' (2000) 47(4) *New Zealand Management* 56; Michael Schiltz, Gerry

of knowledge and information is very important as knowledge has replaced the classic factors of production, i.e. labour, capital and natural resources, to become the key factor of production.[193] The knowledge-based economy works best when knowledge and information are pooled, shared and freely accessible just like other valuable assets such as roads, lands or libraries.[194] Therefore, apart from placing great importance on the creation of knowledge, the economists place an equally great importance on access to and re-use of knowledge and information.[195]

The emergence of the knowledge-based economy in most countries, has seen the landscape of publicly funded research change significantly over the last decades.[196] Apart from the desire to address social issues or to develop a well-informed society, public investment in research is also aimed at economic competitiveness. The large amount of public money invested in research is set off with the economic value to which research data and information could be put into use.[197] However, the benefits of knowledge derived from research appear only when research data and information is disseminated and put into productive use.[198] The amount of money and effort spent in producing research data is going to be of no use unless it can be converted into economic values as, in a knowledge-based economy, data is power and is regarded as the digital fuel of the 21st century.[199] According to Nelson, for maximum economy efficiency, knowledge should be administered as a common pool, with free access to all who can use the knowledge.[200]

Verschraegen and Stefano Magnolo, 'Open Access to Knowledge in World Society?' (2005) 11 *Soziale Systeme* 363.

193 See Dolfsma, above n 183, 4; Mike Cowey, above n 192, 54; Powell and Snellman, above n 185, 199; Candice Stevens, above n 192, 7; Lambooy, above n 178, 1026; Tran Xuan Sam, 'New Characteristics of Knowledge-Based Economies' (2002) 15(4) *Nature, Society, and Thought* 471.

194 Shulman, above n 145, 10.

195 See Joseph Stiglitz, 'Knowledge as a Global Public Good' in Inge Kaul, Isabelle Grunberg and Marc A Stern (eds), *Global Public Goods: International Cooperation in the 21st Century* (The United Nations Development Programme, New York, 1999) 308; Sam, above n 193, 471.

196 See Stevens, above n 192, 6; Shulman, above n 145, 5.

197 See ICSU/CODATA Ad Hoc Group on Data and Information, above n 17; Shulman, above n 145, 3.

198 See Handbook on Responsible Partnering: A Guide to Better Practices for Collaborative Research and Knowledge Transfer Between Science and Industry 5; Peter Johan Lor and Johannes Jacobus Britz, 'Is a Knowledge Society Possible Without Freedom of Access to Information?' (2007) 33(4) *Journal of Information Science* 389.

199 Vivek Kundra, 'Digital Fuel of the 21st Century: Innovation Through Open Data and the Network Effect' (Joan Shorenstein Center Harvard University, 2012).

200 Rebecca S Eisenberg, 'Patents and Data-Sharing in Public Science' (2006) 15(6) *Industrial and Corporate Change* 1016.

It was argued by many scholars that enabling open access to and re-use of publicly funded research data could give funding agencies greater returns on public investments in research.[201] Arzberger et al argue that enabling open access to data generates wealth through downstream commercialisation of outputs.[202] Uhlir and Schroder also argue that sharing of public research data raises the productivity of research, as many types of data can be used beyond the ambit of their original production in diverse and unlimited ways.[203] Uhlir and Schroder propose that, where the research is publicly funded, open access to research data should be the default rule and operating presumption, rather than the exception.[204] They further argue that failure to share publicly funded research data may result in significant lost opportunity costs that are certain to occur, though they are difficult to measure.[205]

Robert Zoellick, President of the World Bank Group, in his speech on democratising development economics points out that there must be a paradigm shift in terms of knowledge flow, arguing that the flow of knowledge could affect development of a country. In the same speech, Zoellick also argues that knowledge must be opened to all as development knowledge is no longer the sole province of the researcher, the scholar or the ivory tower. According to him, Open Data, Open Knowledge and Open Solutions are the new approach in development research, which allow the public to access development knowledge in real time.[206]

Australian economic scholars, Houghton, Steele and Sheehan, in a series of studies on the economic benefits to be gained from improved access to publicly funded research results conclude that new models for scholarly communications, such as open access, have the potential to increase the social returns to public investment in research and development. Houghton, Steel and Sheehan's studies also found that enhanced access to, and greater use of, research findings, would, in turn, increase the

201 Barbara Kirsop, 'Open Access and Developing Countries' (2007) 92(3) *Current Science* 276.
202 Arzberger et al, above n 127, 1777.
203 Uhlir and Schroder, above n 125, 199.
204 Ibid 209.
205 Ibid 200.
206 Robert B Zoellick, 'Democratizing Development Economics' (2010), <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:22716997~pagePK:34370~piPK:42770~theSitePK:4607,00.html> (at 8 February 2011).

efficiency of investment in research and development, benefiting every economy in the world. [207]

At the organisational level, the benefit of open access and re-use under economic theory was highlighted in the OECD Principles and Guidelines for Access to Research Data from Public Funding. It is argued that sharing and granting open access to publicly funded research data could provide greater returns from the public investment in research.[208] Further, in the OECD Report on the Knowledge Based Economy, it is argued that government policies in the knowledge based-economy need to give priority to enhancing knowledge diffusion by promoting the diffusion of new technologies to a wide variety of sectors and firms.[209]

The Council of European Union in their call for a shift to the knowledge based economy, urged the member states to remove barriers over access to knowledge, by respecting the "fifth freedom" i.e. the free movement of knowledge. The fifth freedom aims to promote the optimal use of intellectual property created in public research organisations by encouraging open access to knowledge.[210] The World Bank in announcing its decision to open to public access more than 7000 data sets that were previously available to only 140,000 subscribers, declared that the most valuable currency of the World Bank is not its money, it is its information.[211]

The external benefit under the economic theory provides justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

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207 John Houghton, Colin Steele and Peter Sheehan, 'Research Communication Costs in Australia: Emerging Opportunities and Benefits: A Report to the Department of Education, Science and Training' (Centre for Strategic Economic Studies Victoria University, Melbourne, 2006).

208 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

209 Anonymous, above n 184, 7.

210 See Yannis Ioannidis, 'Open Access Repository Infrastructure for European Research Publications' (Paper presented at the International Conference: Open Access: Research, Education, Public Data 16-17 December 2010, Athens, Greece, 2010); Anonymous, 'Council Calls for Swift Progress to Knowledge Economy' (2008), <http://cordis.europa.eu/fetch?CALLER=FP7_NEWS&ACTION=D&DOC=9&CAT=NEWS&QUERY=011957fb0aba:af52:36152058&RCN=29243> (at 8 March 2010).

211 Stephanie Strom, 'World Bank is Opening its Treasure Chest of Data', *New York Times* (online), 2 July 2011, <http://www.nytimes.com/2011/07/03/business/global/03world.html?pagewanted=all>.

2.2.2 Benefit Under Innovation Theory

The innovation theory deals with new modalities of converting existing knowledge into ideas that can change the way people live, play or work.[212] Under innovation theory, two essential prerequisites that become the driver and source of innovation are i) a problem in need of solving; and ii) knowledge and information.[213] The innovation theory is built upon the premise that every innovation makes use and is built on the intellectual property foundation of the pre-existing knowledge.[214] According to Shulman, the interdependence of innovation to previous knowledge applies as much to high-tech fields as it does to the arts and humanities.[215] The argument that innovation is dependent on the use of previous knowledge is aptly described by Sir Isaac Newton in one of his most quoted words in the area of innovation: 'If I have seen further it is by standing on the shoulders of giants'.

Since it has been recognised that innovation is the application of knowledge to produce new knowledge, better use of existing data and more effective dissemination of data becomes imperative. Ensuring timely access by innovators to the relevant data is of key importance to spur further innovation.[216] By making data easily accessible, it could help to spur further innovation.[217] In this regard, open access to data which supplies a wealth of knowledge has been recognised as one of the building blocks and key input of innovation.[218] According to Dominique Foray, open access to data are key features in the process of scientific discovery, invention and innovation.[219]

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212 Ioan Voicu, 'Towards Innovative Societies' (2007), <http://www.onlineopinion.com.au/view.asp?article=6262> (at 24 October 2010).

213 Lauriault and McGuire, above n 27.

214 See Stiglitz, above n 195, 315; Shulman, above n 145, 7.

215 Shulman, above n 145,7.

216 See Kundra, above n 199, 15.

217 See Johannessen, Olsen and Olaisen, above n 185, 121; Robinson Esalimba and William New, 'Spurring Local Innovation in Africa By Improving Access to Information' (2009), <http://www.ip-watch.org/2009/10/19/spurring-local-innovation-in-africa-by-improving...> (at 25 March 2010).

218 See UNCTAD Secretariat, 'Information Economic Report 2007-2008 ' (United Nations, 2007); John Seely Brown and Paul Duguid, 'Local Knowledge: Innovation in the Networked Age' (2002) 33(4) *Management Learning* 434.

219 Dominique Foray, 'Introductory Remarks by Session Chair' (Paper presented at the International Symposium on Open Access and the Public Domain in Digital Data and Information for Science, Washington DC, 2004).

Henry Chesbrough in his book "Open Innovation" states that being open with data and information will engender more innovation and help firms gain a competitive advantage.[220] Chesbrough observes that many innovative firms have shifted from the closed innovation model to the open innovation model, whereby a firm utilises both its own ideas as well as ideas from others enabling innovations to move easily between the firms.[221] This new model of innovation has changed the way firms search for new ideas, adopting open search strategies that involve the use of a wide range of external actors and sources to help them achieve and sustain innovation.[222] The firms which apply the open innovation model require access to knowledge and information from outside.[223]

Apart from the firms, public consumers are now acting as users as well as creators and innovators.[224] These so called "grassroot" creators and innovators add to the importance of open access to and re-use of knowledge. In the grassroot innovation, the diffusion of knowledge is just as significant as its creation, leading to increased attention on 'knowledge distribution networks' and 'national systems of innovation'.[225] Enabling open access to and re-use of knowledge and information is beneficial to the society at large as less monopoly on knowledge and information means that there will be broader participation and more innovation in the production of information and culture in the digital age.[226] It follows that, enabling open access to and re-use of data will allow anyone with an innovative idea to add value to existing data and information often in initially unforeseen or unanticipated ways.[227] This is due to the fact that no one producer of information can design all information products to meet the needs of all users in a modern information-based economy.

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220 Michael Burkett, 'Balancing IP Security and Open Innovation' (2007) 11(6) *Supply Chain Management Review* 12.

221 Henry W Chesbrough, 'The Era of Open Innovation' (2003) (Spring) *MIT Sloan Management Review* 37.

222 Keld Laursen and Ammon Salter, 'Open for Innovation: the Role of Openness in Explaining Innovation Performance Among UK Manufacturing Firms' (2006) 27 *Strategic Management Journal* 131.

223 John Teresko, 'Open Innovation? Rewards and Challenges' (2004) (June) *Industry Week* 20.

224 Mark Cooper, 'Access to the Knowledge Commons in the Digital Age' (2006) 16(3) *Consumer Policy Review* 109.

225 Anonymous, above n 184, 24; Anonymous, 'Innovation at the Grassroots' (2010) *Malaysian Foundation for Innovation*, <http://www.yim.my/index.cfm?&menuid=19&parentid=16> (at 14 October 2010).

226 Cooper, above n 224, 114.

227 Mike Linksvayer, 'Digital Economy Defined' (2009), <http://creativecommons.org/weblog/entry/15901> (at 5 May 2010).

Hence, by enabling open access to and re-use of publicly funded research data there is possibility to expand data usage and application beyond its original analysis.[228]

From the examination of innovation theory, it could be assumed that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. Research activities conducted in the universities generate not only new products, but also contribute vast information and knowledge, which can be exploited by others to develop even better products and innovation. In this regard, research activities increasingly play a crucial role, not only in knowledge production, but also in innovation.[229]

Despite the importance of knowledge for innovation, Robert Merges observes that the strengthening of property rights over information assets has put significant pressure on innovative industries, as information has been used by the information proprietor as a pure instrument of rent seeking.[230] Paul A David in his analysis of the consequences of the exploitation of intellectual property rights (IPR) on publicly and privately funded research results argues that patenting and enforcement of IPR obtained on academic research results could become a potential impediment to innovation.[231] In this regard, Alan Greenspan, the Chairman of the US Federal Reserve argues that there should be a right balance between intellectual property protection and innovation.[232] Jerry Reichman also argues that intellectual property rights need to balance the legal incentives to innovate against the benefits of free competition and promotion of the progress of science and useful arts.[233]

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228 See Anne Fitzgerald and Kylie Pappalardo, 'Building the Insfrastructure for Data Access and Reuse in Collaborative Research: An Analysis of the Legal Context' (Queensland University of Technology, 2007); Heather A Piwowar, Roger S Day and Douglas B Fridsma, 'Sharing Detailed Research Data Is Associated with Increased Citation Rate' (2007) (3) *PloS ONE* e308.

229 Shulman, above n 145, 6.

230 Robert P Merges, 'The Trouble With Trolls: Innovation, Rent-Seeking, and Patent Law Reform' (2009) 24 *Berkeley Technology Law Journal* 1583.

231 Paul A David, 'Mitigating "Anticommons" Harms to Research in Science and Technology: New Moves in "Legal Jujitsu" Against Adverse Consequences of the Exploitation of IPR on Publicly and Privately Funded Research Results' (2010) *SIEPR Discussion Paper 10-009* 1, <http://siepr.stanford.edu/system/files/shared/pubs/papers/pdf/10-030_Paper.pdf> (at 6 January 2011).

232 Marjut Salokannel, 'Global Public Goods and Private Rights: Scientific Research and Intellectual Property Rights' (2003) 1, <http://www.iprinfo.com/tiedostot/5icFWowu.pdf> (at 12 October 2010).

233 Jerry H Reichman and Jonathan A Franklin, 'Privately Legislated Intellectual Property Rights: Reconciling Freedom of Contract with Public Good Uses of Information' (1999) 147(4) *University of Pnennsylvania Law Review* 882.

The positive link between open access and innovation has been argued by many advocates of open access. In canvassing the benefits of open access and re-use to innovation, Uhlir and Schroder argue that the overprotection or unavailability of scientific data and information may lead to deadweight social costs, taxing the innovation system in each country and slowing scientific progress.[234] It is further argued by Uhlir and Schroder that, the innovation system should not be considered as a closed system as a specific degree and form of openness is required for the dynamics of innovation system.[235] In order for innovation to be opened, alternative innovation models such as open innovation and open collaboration are of great importance in generating innovation compared to a closed-system of innovation.[236]

Peter Drahos argues that one of the strategies to spur innovation is by ensuring access to copyright, patent, software and publicly funded research for various groups through an open access model.[237] It is further argued by Drahos that the model of governance for open access should give priority to maximising public participation in the innovation process as well as maximising the spill over benefits of knowledge, with a minimum social cost of accumulating knowledge.[238] Other scholars such as Norris, Olsen and Olaisen also argue that open access to and re-use of research data could become one of the keys to start a new wave of innovation.[239] Choksi et al propose two fundamental principles upon which to base policy decisions about data sharing and intellectual property: i.e. impediments to innovation in research processes should be minimised and the fruits of research should be made as widely accessible as possible, particularly to the people who need them the most.[240]

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234 Uhlir and Schroder, above n 125, 201.

235 Henry Etzkowitz and Loet Leydesdorff, 'The Dynamics of Innovation: From National Systems and "Mode 2" to a Triple Helix of University-Industry-Government Relations' (2000) 29 *Research Policy* 115.

236 Ahmed Abdel Latif, 'Egypt's Role in the A2K Movement: An Analysis of Positions and Policies' in Nagla Rizk and Lea Shaver (eds), *Access to Knowledge in Egypt: New Research on Intellectual Property, Innovation and Development* (Bloomsbury Academic, London, 2010) 17.

237 Peter Drahos, 'Access to Knowledge: Time for a Treaty?' (2005), <www.icstd.org> (at 17 September 2010).

238 Ibid.

239 Ray P Norris, 'How to Make the Dream Come True: The Astronomers' Data Manifesto' (2007) 6(Supplement) *Data Science Journal* S116; Johannessen, Olsen and Olaisen, above n 185, 123.

240 Dave A Chokshi, Michael Parker and Dominic P Kwiatkowski, 'Data Sharing and Intellectual Property in a Genomic Epidemiology Network: Policies for Large-Scale Research Collaboration' (2006) 84(5) *Bulletin of the World Health Organization* 382.

Another argument on the benefit of open access to innovation comes from Australian information and innovation expert Dr Terry Cutler, who argues that innovation requires an open model system, which is in sharp contrast to the closed models of neo-classical economics.[241] According to Cutler open access underpins the freedom to access and use prior art and knowledge in the exploration and development of new knowledge and insights. This freedom is essential to creativity and innovation.[242] Further according to Cutler, by enabling open access and re-use, the research data can usefully be packaged or integrated with other products or services spurring further innovation.[243] Cutler's argument is supported by Australian Innovation Minister Kim Carr who was reported to say that if Australia is serious about boosting innovation, it has to get knowledge and information flowing freely.[244]

Other Australian experts, Houghton, Steele and Sheehan, in their report prepared for the Australian Department of Education, Science and Training also argue on the benefit of enabling open access to and re-use of research data for the purpose of innovation. It is stated in the report that without an open access regime, the research data will remain under private custody and under-utilised by other parties.[245] They also argue that broad access to these publicly-funded information resources enables the exploration of topics not envisioned by the initial investigators, permitting the creation of new data sets when data from multiple sources are combined.[246]

Ioan Voicu in "Towards Innovative Society" argues that the push towards innovation requires a policy which allows diffusion of knowledge to reap its returns in the form of innovation.[247] Brown et al in discussing the benefits of open access to innovation, give the example on how the freedom to access and re-use of genetic data has inspired and enabled scientists to transform a collection of individual sequences into something incomparably richer. According to them, free and unrestricted access to

241 Terry Cutler, 'Innovation and Open Access to Public Sector Information' in Brian Fitzgerald (ed), *Legal Framework for e-Research: Realising the Potential* (Sydney University Press, Sydney, 2008) 29.
242 Ibid 33.
243 Ibid 32.
244 Bernard Lane, 'Carr Favours Open Access', *The Australian* (online), 24 September 2008, <http://www.theaustralian.com.au/higher-education/carr-favours-open-access/story-e6frgcjx-1111117564774>.
245 Houghton, Steele and Sheehan, above n 207, 99.
246 Ibid.
247 Voicu, above n 212.

the raw data helps the scientists to develop the powerful methods, tools, and resources that have made the whole much greater than the sum of the individual sequences.[248]

At the organisational level, the Council of EU in its strong support for open access, considers that access to and dissemination of scientific information can help accelerate innovation.[249] The United Nations Conference on Trade and Development (UNCTAD) in its Information Economic Report also argues that innovation rarely occurs in vacuum or in isolation. The report further argues that modern day innovators do not simply exist in blank space conjuring up new, unprecedented ideas. Innovation is becoming significantly 'recombinant' and can be influenced by a wide range of factors. The UNCTAD report suggests that to spur further innovation, knowledge and information has to be widely shared as abundant information creates a pro-innovation force by itself.[250]

The OECD 2010 report on 'Enhancing the Role of Tertiary Education in Research and Innovation' argues that the transmission and diffusion of new knowledge is just as significant for innovation as knowledge creation.[251] According to the report, scientific data and information which is an essential ingredient of innovation is mostly derived from basic research predominantly conducted by universities and public research institutions.[252] The OECD in promoting open access to and re-use of publicly funded research data argues that open access reinforces open scientific inquiry, encourages diversity of studies and opinion and promotes new areas of work.[253] The OECD, in its Ministerial Report on Innovation Strategy states that innovation today is a highly interactive process of collaboration across a growing and diverse network of stakeholders, institutions and users where actors of different

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248 Patrick O Brown, Michael B Eisen and Harold E Varmus, 'Why PLoS Became a Publisher' (2003) 1(1) *PLoS Biology* 1.

249 Anonymous, 'Council Conclusions on Scientific Information in the Digital Age: Access, Dissemination and Preservation' (Council of the European Union, 2007).

250 UNCTAD Secretariat, above n 218.

251 Simon Marginson, 'Open Source Knowledge and University Rankings' (2009) 96 *Thesis Eleven* 19.

252 Anonymous, 'Ministerial Report on the OECD Innovation Strategy: Innovation to Strengthen Growth and Address Global and Social Challenges' (OECD, 2010) 7.

253 See OECD Principles and Guidelines for Access to Research Data from Public Funding 2007; Terry J Fetterhoff and Dirk Voelkel, 'Managing Open Innovation in Biotechnology' (2006) 49(3) *Research Technology Management* 16.

backgrounds are involved in the process. [254] According to the report, since creators and innovators are no longer confined to a certain group of people and can be found among the masses at various levels of society, empowering people to innovate by way of facilitating efficient knowledge flows in open access networks has become the new principle for innovation.[255]

Further, in the OECD Ministerial report, it is stated that access to publicly generated or publicly funded information should remain open so as to allow innovative commercial and non-commercial re-use of data and information.[256] Among the suggestions made by the OECD to strengthen national science and innovation systems, is to increase online access to scientific data and information.[257] In light of the above suggestions, the OECD recommends an open access model to the OECD countries which see innovation as the main driver of economic growth.[258] There is a consensus among the OECD Ministers who signed a declaration reaffirming the public right to access publicly funded research data that open access to and unrestricted use of data and information promote scientific progress and contribute decisively to the advancement of scientific research and innovation.[259] In line with the Ministers' declaration, the OECD has switched its main emphasis in policy on research and innovation in universities, from the direct formation of commercial intellectual property to the removal of barriers to the free dissemination of knowledge goods.[260]

The external benefit under the innovation theory provides justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

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254 See Anonymous, above n 252, 2; Helina Melkas and Vesa Harmaakorpi, 'Data, Information and Knowledge in Regional Innovation Networks' (2008) 11(1) *European Journal of Innovation Management* 104.

255 Anonymous, above n 252, 3; Anonymous, 'Leading Through Challenge University Strategy 2009-2011' (Dublin City University, 2009) ii, iv.

256 Anonymous, above n 252, 17.

257 OECD Global Science Forum, 'Opportunities, Challenges and Good Practices in International Research Cooperation between Developed and Developing Countries' (OECD, 2011) 7.

258 Anonymous, above n 252, 4; Rustam Lalkaka, 'Technology Business Incubators to Help Build and Innovation-Based Economy' (2002) 3(2) *Journal of Change Management* 168.; Rebecca Fannin, 'Unlocking Innovation' (2005) *CEO Magazine* 40.

259 'Declaration on Access to Research Data From Public Funding', above n 42.

260 Marginson, above n 251, 18.

2.2.3 Benefit Under Public Good Theory

Under public good theory, a public good is characterised by two key properties: i) non-rivalrous consumption; and ii) non-excludability. Non-rivalrous consumption means that there is zero marginal cost from an additional individual enjoying the benefits of the public good. It means that the consumption of one individual does not detract from that of another.[261] While non-rivalrous means that no one should be excluded from enjoyment of public good, non-excludability implies that no one can be excluded from using the public good.[262]

Research data has long been recognised by the economists as having all the characteristic of public good due to its strong qualities of *publicness*, that is, its benefits are non-rivalrous in consumption and non-excludable.[263] Research data being a component of knowledge and information is also categorised as a global public good, as its benefits are universal in terms of countries, people and extending to both current and future generations.[264] Being a global public good, the utility of research data rests in their global exchange and propagation and there are global benefits for disseminating research data.[265] To maintain research data as a global public good, public intervention to balance the mechanism and institutions of production and dissemination of research data on the one hand and providing access to research data on the other hand is required.[266]

From the examination of public good theory, it could be assumed that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. Lievesley argues that research data are public goods and therefore should remain in the public realm.[267] Since research data has been recognised as public goods, the general presumption is that when research is carried out or sponsored by

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261 See Salokannel, above n 232, 1; Stiglitz, above n 195, 309.

262 Stiglitz, above n 195, 309.

263 Thomas Dreier, 'Overview of Legal Aspects in the European Union' (Paper presented at the International Symposium on Open Access and the Public Domain in Digital Data and Information for Science, Washington DC, 2004).

264 Inge Kaul, Isabelle Grunberg and March A Stern, 'Defining Global Public Goods' in Inge Kaul, Isabelle Grunberg and March A Stern (eds), *Global Public Goods* (Oxford University Press, New York, 1999) 2; Salokannel, above n 232, 1; Stiglitz, above n 195, 316.

265 Thomas J Goehl, 'Access Denied' (2007) 115(10) *Environmental Health Perspectives* A482.

266 See Salokannel, above n 232, 10.

267 Lievesley, above n 128.

public agencies, scientific data and information generated as part of that research, it should be made publicly available as public goods.[268] The amount of money and effort spent in producing research data is going to be of no use unless it can be converted into values for public good.[269] Hence, access to and re-use of research data should not be exclusive but instead should be made available to all and widely disseminated to the public in order for the benefits to be maximised.[270]

Since public grants received by the researchers are intended primarily for public good, the research data collected or generated from public grants should not be viewed as their personal property.[271] The commodification or monopoly of research data is a threat to the utilisation of research data as public goods.[272] Restricting access to and re-use of research data will deprive those who can most benefit from scientific and non-scientific data and information, such as the academicians, the professionals, the policy makers, the students and the patients. In recognising data and information as public goods, Carol Rose argues that some kinds of property such as data and information should not be held exclusively in a private hands, but should be open to the public.[273] Pamela Samuelson also argues that there is a need to construct a new politics of intellectual property which is grounded on the realisation that information is not only, or mainly, a commodity, but is also an important resource and input to learning, culture, competition, innovation, and democratic discourse. Samuelson further argues that intellectual property must be a servant, not a master of the information society.[274]

Another scholar, Mark Cooper argues that the line between the private incentives of privilege protection and the public value of the circulation of ideas needs to be

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268 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 69.

269 Shulman, above n 145, 7.

270 See Nicholas Dittert, Michael Diepenbroek and Hannes Grobe, 'Scientific Data Must Be Made Available to All' (2001) 414 *Nature* 393; P Arzberger et al, 'Promoting Access to Public Research Data for Scientific, Economic, and Social Development' (2004) 3 *Data Science Journal* 136.

271 Terry E Hendrick, 'Justifications for the Sharing of Social Science Data' (1988) 12(2) *Law and Human Behavior* 165.

272 Lor and Britz, above n 198, 391.

273 Carol Rose, 'The Comedy of the Commons: Custom, Commerce, and Inherently Public Property ' (1986) 53(3) *University of Chicago Law Review* 713.

274 See Pamela Samuelson, 'Mapping the Digital Public Domain: Threats and Opportunities' (2003) 66(1&2) *Law & Contemporary Problems* 170; James Boyle, 'Foreword: The Opposite of Property?' (2003) 66(1&2) *Law & Contemporary Problems* 13.

pushed sharply in the direction of the public.[275] By foregoing proprietary rights to data and making it freely available to the public it will benefit the individual as well as the community at large, as the data users could optimise the value and use of the data for public good.[276] According to Boyd and Crawford, computer scientists, physicists, economists, mathematicians, political scientists, bio-informaticists, sociologists and many others are clamouring for access to massive quantities of data and information.[277]

It is further argued that it is no longer enough for the public simply to have access to research data and information Rather, data and information must be capable of being applied and re-used by the public for public good.[278] Among the potential users of research data and information are groups, experts and professionals in various fields, such as academicians, scientists, engineers, professors, administrators, company managers, government policy makers, students, workers or activists who need to access and re-use data and information for a variety of reasons.[279] By enabling open access and re-use, policy makers can read for themselves the evidence from research data on which the policy decision will be made.[280]

John Willinsky argues that enabling open access and re-use also allows research data to be accessed due to some personal concern such as health or safety.[281] Individuals with medical conditions, or family members of such individuals could benefit from

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275 Mark Cooper, above n 224, 113.

276 Fiona Stanley, 'A Win:Win for Data Access: Balancing Public Good with Privacy Concerns' in Brian Fitzgerald (ed), *Legal Framework for e-Research* (Sydney University Press, Sydney, 2008) 401.

277 Danah Boyd and Kate Crawford, 'Six Provocations for Big Data' (Paper presented at the A Decade in Internet Time: Symposium on the Dynamics of the Internet and Society, Oxford Internet Institute, 21 September 2011).

278 See M Lynne Markus, 'Toward a Theory of Knowledge Reuse: Types of Knowledge Reuse Situations and Factors in Reuse Success' (2001) 18(1) *Journal of Management Information System* 58; Jeffey L Furman and Scott Stern, 'Climbing Atop the Shoulders of Giants: The Impact of Institutions on Cumulative Research' (2006) *NBER Working Papers 12523* 1, <http://www.nber.org/papers/w12523> (at 5 October 2010); Thomas J Goehl, above n 265, A482; Allen Scherlen and Matthew Robinson, 'Open Access to Criminal Justice Scholarship: A Matter of Social Justice' (2008) 19(1) *Journal of Criminal Justice Education* 57.

279 Ify E Aguolu, 'Accessibility of Information: A Myth for Developing Countries?' (1997) 98(1132) *New Library World* 27.

280 See Scherlen and Robinson, above n 278, 62; Evelyn Kerslake and Margaret Kinnell, 'Public Libraries, Public Interest and the Information Society: Theoretical Issues in the Social Impact of Public Libraries' (1998) 30(3) *Journal of Librarianship and Information Science* 164.

281 John Willinsky, 'As Open Access is Public Access, Can Journals Help Policy Makers Read Research?' (2004) 29(3/4) *Canadian Journal of Communication* 383.

open access to and re-use of data and information from medical research.[282] The growing benefits of open access to and re-use of medical data and information has been one of the reasons the US National Library of Medicine developed Medline Plus, which provides online medical data and information to the public.[283] The largest research funder for research on autism, Autism Speaks, in announcing its new policy for free access to key research findings derived from its research grant, states that this new policy will allow individuals with autism, their families and advocates, as well as interested researchers to access and integrate the results of the research with other research and data.[284] In the US, a group of scientists from industries, universities and non-profit groups who collaborate on alzheimer's research, report that sharing of scientific research data has led to encouraging progress in their research.[285]

Among the universities, the European University Association (EUA), (a body representing higher education institutions in 46 European countries) through its Working Group on Open Access has released a statement supporting an EU-wide open access mandate on 26 January 2007. The EUA Working Group's statement acknowledges the universities' public role and responsibility as "guardians" of research knowledge/results as a public good and the need for well-functioning open access repositories and networking between the universities for archiving purposes.[286] The Harvard University's copyright policy favours the concept that public benefit should take precedence over financial gain and it encourages the

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282 Wikipedia, 'Open Access (Publishing)' (2010), <p://en.wikipedia.org/wiki/Open_access_(publishing)> (at 25 March 2010).

283 Elana Varon, 'Medline Plus: Online Medical Info for Ordinary People' (1999), <http://articles.cnn.com/1999-01-18/tech/9901_18_medline.idg_1_biomedical-journals-medical-librarians-common-diseases?_s=PM:TECH> (at 23 September).

284 Peter Suber, 'Autism Speaks Announces New Policy to Give Families Easy, Free Access to Key Research Findings' (2008), <http://www.autismspeaks.org/about-us/press-releases/autism-speaks-announces-new-policy-give-families-easy-free-access-key-resear> (at 1 September 2010).

285 Gina Kolata, 'Sharing of Data Leads to Progress on Alzheimer's', *The New York Times* (online), 12 August 2010, <http://www.nytimes.com/2010/08/13/health/research/13alzheimer.html>.

286 'Statement from the EUA Working Group on Open Access' (2007) *European University Association*, <http://www.eua.be/fileadmin/user_upload/files/newsletter/EUA_WG_open_access.pdf> (at 2 March 2010).

notion that works produced at the university should be used for the greatest possible benefit, with the widest possible dissemination and use of such works.[287]

The external benefit under the public good theory provides justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

2.2.4 Benefit Under Social Justice Theory

Social justice theory is equated with the notion of equality or equal opportunity in society. Two of the most prominent proponents of social justice are John Rawls and David Miller, each through their own work "A Theory of Justice" and "Principles of Social Justice".[288] John Rawls' theory of social justice is referred to as "theory of justice as fairness". Rawls' theory of social justice contains three main principles i.e. "equal liberties principle", "equal opportunity principle" and "the difference principle". These three principles require a fair distribution of opportunities to the members of society. Any inequalities in society must be organised so that they are to the greatest benefit of the least advantaged members of society. By the least advantaged, Rawls is referring to those who lack what he calls "primary goods" which include the right to enjoy and to share in scientific advancement, literary works or artistic production and its benefits. [289]

Like Rawls, Miller's theory of social justice promotes an equality principle based on the ideal that benefits should be distributed equally. Miller's theory of social justice deals not only with the distribution of benefits in society, but also deals with how the benefits should be distributed within society. According to Miller, the benefits which need to be equally distributed to society are wide ranging, and these include the benefits arising from access to knowledge and information.[290] In distributing the benefits among the members of society, Miller's theory focuses on the aspects of

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287 Steven Bachrach et al, 'Intellectual Property: Who Should Own Scientific Papers?' (1998) 281(5382) *Science Magazine* 1459.

288 See John Rawls, *A Theory of Justice* (Revised ed, Harvard University Press, Cambridge, Masssachusetts, 1999); David Miller, *Principles of Social Justice* (Harvard University Press, Cambridge, Massachusetts, 1999). See also, David Miller, *Social Justice* (Oxford University Press, London, 1976).

289 Scherlen and Robinson, above n 278, 17.

290 Ibid 66.

need, desert, and equality. The need which becomes the priority refers to benefits which one is lacking that could harm or impede an individual's capacity to function. Disparity in distribution of these benefits may interfere with an individual's ability to satisfy their basic needs and as a result the basic needs of some will not be met as readily as others .[291]

From the examination of Rawls' and Miller's theories of social justice, it could be assumed that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. Mark Mattaini in his support for open access argues that access to knowledge and information is an issue of social justice. He further argues that when it comes to addressing serious social concerns and supporting human rights, access to information is clearly important.[292] Other scholars such as Schiltz et al have also linked universal, public and open dissemination of scientific knowledge with the issue of social justice.[293] To strengthen their argument on open access to knowledge as a form of social justice, Schiltz et al quote the argument put forward by Stichweh:

> If science can claim universality, especially social universality in the sense of presupposing validity of its truth claims for any individual whosoever in the world, then it follows with a certain consequence that access to these universal truths should not be denied to any one of those individuals for whom these truths are supposed to be valid on the first hand. And if openness is the only standard acceptable in dealing with scientific knowledge then again this openness should be realized for a public of maximum social extension. [294]

Another scholar, Das in "Open Access to Knowledge and Information" also links open access to social justice principles. Das argues that in the information society, free flow of information is a fundamental principle for bridging the knowledge gaps between privileged and under-privileged communities. According to him, open access to information is a key contributor in provisioning universal access to

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291 Ibid 71.

292 Mark A Mattaini, 'Editorial: Open Access Journals as a Justice Issue' (2004) 13(1) *Behavior and Social Issues* 1.

293 Stichweh 'The Multiple Publics of Science: Inclusion and Popularization' in Schiltz, Verschraegen and Magnolo, above n 192, 352.

294 Ibid.

information and knowledge.[295] Cribb and Sari argue that people without access to knowledge and information are not merely deprived of their benefits, but will be powerless as they may be outcast, playing the role of spectators in the human race rather than runners in it.[296]

Jack Balkin, of the Yale Information Society Project also argues that access to knowledge is a question of justice within a society and across different societies and countries.[297] It is further argued by Balkin that access to knowledge, such as open access, is linked to fundamental principles of justice, freedom and economic development, as it promotes human development through producing lots of information goods for people and distributing them widely.[298] Ulrich Poschl argues that open access, which has stretched beyond the scientific domain into politics and civil society, is instrumental in creating non-hierarchical, knowledge based-networks. According to Poschl, the openness of open access has helped to tackle the issue of knowledge inequality through equal inclusion of access to knowledge in the internet.[299] Another scholar, Ulrich Herb argues that open access is an instrument to eradicate information poverty, another sign of social inequality under social justice theory.[300] Besides Herb, Johannes Britz also argues that information poverty upsets the principle of social justice, but could be reduced by ensuring that each person in the community has an equal right of access to essential information and equal opportunities to exercise their rights to access the information.[301]

In a more recent writing, Britz together with Lor argue that to be able to participate in knowledge and information societies, a well developed and well maintained ICT infrastructure and accessibility of information alone is not enough. Besides

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295 Anup Kumar Das, Open Access to Knowledge and Information: Scholarly Literature and Digital Library Initiatives - The South Asian Scenario (UNESCO, New Delhi, 2008).

296 Julian Cribb and Tjempaka Sari, *Open Science: Sharing Knowledge in the Global Century* (CSIRO Publishing, 2010) 3.

297 Jack M Balkin, 'What is Access to Knowledge?' (2006), <http://balkin.blogspot.com/2006/04/what-is-access-to-knowledge.html> (at 25 March 2010).

298 Ibid.

299 Ulrich Poschl, 'Open Access to New Knowledge' (2006) 4 *MaxPlanck Research* 27, <http://www.atmospheric-chemistry-and-physics.net/pr_acp_open_access_to_new_knowledge.pdf> (at 8 April 2010).

300 Ulrich Herb, 'Open Access - A Panacea? Science, Society, Democracy, Digital Divide' (2008) 15(2) *First Monday* 11.

301 Johannes J Britz, 'To Know or Not to Know: A Moral Reflection on Information Poverty' (2004) 30(3) *Journal of Information Science* 199-201.

information infrastructure and its content, the knowledge and information content that is accessible should also be affordable, available and timely relevant. While agreeing that creators of information products must be fairly compensated, they argue that, the current imbalance puts the information commons at risk. According to them, the principles of ownership and fair compensation should not override the moral obligation towards the creation of equal opportunities for all to gain access to essential information.[302]

The external benefit under social justice theory provides justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

2.2.5 Benefit Under Human Rights Theory

Under human rights theory, the right to receive and to communicate information is regarded as the umbrella of access to knowledge and the touchstone of the freedom of information.[303] The right to receive and impart information is explicitly recognised in the Universal Declaration of Human Rights 1948 (UDHR) as a fundamental human right. Article 19 of the UDHR states that:

> Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

A similar provision can be found in Article 19 of the International Covenant on Civil and Political Rights (ICCPR). Article 19 of the ICCPR explicitly guarantees freedom of expression and information as follows:

> Everyone shall have the right to hold opinions without interference. Everyone shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either

302 Lor and Britz, above n 198, 393.

303 See Toby Mendel, 'The Right to Communicate' (2003), <http://portal.unesco.org/ci/en/ev.php-URL_ID=9436&URL_DO=DO_TOPIC&URL_SECTION=201.html> (at 5 May 2010); Anonymous, 'Comments on the Draft Open Government Partnership Information Disclosure Policy' (Centre for Law and Democracy, 2011); 'Statement on the Right to Communicate' (2003) *Article 19 Global Campaign for Free Expression*, <http://www.article19.org/pdfs/publications/right-to-communicate.pdf> (at 5 May 2010) 4; Scherlen and Robinson, above n 278, 71.

orally, in writing or in print, in the form of art, or through any other media of his choice.

It is also stated in Article 15.1 of the International Covenant on Economic, Social and Cultural Rights (ICESCR) that:

> The States Parties to the present covenant recognize the right of everyone: to take part in cultural life; to enjoy the benefits of scientific progress and its applications; to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.

The right to receive and impart information is also recognised by the Inter-American Court of Human Rights of American-States countries. The Court rules that access to information and knowledge is a pre-condition to the existence of a free society, asserting that a society that is not well informed is not completely free.[304] Article 4 of the Declaration Principles of the Civil Society Declaration to the World Summit on the Information Society 2002 affirms that everyone has the right to receive and impart information and ideas through any media and regardless of frontiers. Article 4 of the Declaration also affirms that everyone, everywhere should have the opportunity to participate and no one should be excluded from the benefits the information society offers.[305] In light of the right to receive and impart the information recognised under human rights theory, the researchers have the right to communicate their research data and information freely and as widely as possible.

From the examination of human rights theory, it can be assumed that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. In the global information age, access to knowledge and information has become one of the most important human rights since it is synonymous with the individual quality of life.[306] Jack Balkin, the founder and director of the Yale Information Society Project, argues that open access is part of human rights, therefore people could resist increases to intellectual property protection on the basis

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304 Carolina Almeida A Rossini, above n 6, 14.

305 'Civil Society Declaration to the World Summit on the Information Society' (2003) *WSIS Civil Society*, <http://www.worldsummit2005.de/download_en/WSIS-CS-Dec-25-Feb-04-en.pdf> (at 25 February 2010).

306 Anonymous, 'Access to Scientific Knowledge "Should be a Basic Human Right"' (1999) 399 *Nature* 194; Kerslake and Kinnell, above n 280, 163.

that it is a violation of universal human rights.[307] John Willinsky in "The Access Principle", argues the importance of open access as a means of encouraging political participation founded on the public right to know.[308] Jeremy Malcolm, Consumers International's (CI) Project Coordinator for Intellectual Property and Communications, argues that access to information and knowledge should involve a broad range of stakeholders as access to knowledge and information could advance human rights and democracy.[309]

Among the non-governmental bodies, the Alliance for Taxpayer Access (ATA) argues that citizens, as taxpayers, have a right to expect that information from publicly funded research be made available and readily accessible to the public.[310] The Glasgow Declaration issued by the International Federation of Library Associations and Institutions (IFLA) calls upon libraries and information services and their staff to provide uninhibited access to information based upon the fundamental right of human beings both to access and to express information without restriction.[311] The Washington Declaration on Intellectual Property and the Public Interest, acknowledges the role of open access to promote and protect rights to seek and impart information in the face of expansions in intellectual property rights including in the digital environment.[312]

At inter-governmental level, the EU Ministers' Declaration on Human Rights and the Rule of Law in the Information Society states that access to information will stimulate wider dissemination of information regarding social, economic and cultural aspects of life, and can bring about greater inclusion and overcome forms of

307 Balkin, above n 297.

308 Willinsky, above n 3, 131.

309 Jeremy Malcolm, above n 5.

310 Alliance for Taxpayer Access, 'Expanding the NIH Public Access Policy Will Advance Science, Innovation, Competition, and the Good of the American Public' (2010), <htpp://www.taxpayeraccess.org> (at 2 April 2010).

311 'The Glasgow Declaration on Libraries, Information Services and Intellectual Freedom' (2002) *International Federation of Library Associations and Institutions*, <http://archive.ifla.org/faife/policy/iflastat/gldeclar-e.html> (at 12 March 2010).

312 'The Washington Declaration on Intellectual Property and the Public Interest' (2011) *Global Congress on Intellectual Property and the Public Interest*, <http://infojustice.org/wp-content/uploads/2011/09/Washington-Declaration-Print.pdf> (at 8 October 2011).

discrimination.[313] The benefit of open access and re-use under human rights theory is also highlighted in a report submitted by the International Commission for the Study of Communication Problems to UNESCO. The report which is known as the Mcbride Report states that a full understanding of the events and issues which affect individuals can be attained only by the simultaneous supply of data, information and facts.[314] Another report from an informal meeting on WIPO Development Agenda and a Treaty on Access to Knowledge held in Geneva recognises that access to knowledge is a basic human rights, and restrictions on access ought to be the exception, not the other way around.[315]

In Australia, the benefit of open access and re-use under human rights theory is highlighted in the Victorian Government's Charter of Human Rights and Responsibilities.[316] An Australian Senator Kim Carr, in proposing the Australian Accessibility Framework, argues that data derived from government funding will be available to the wider community to communicate new ideas and infuse public debate.[317] In Deakin University's, Submission to the Inquiry Into Improving Access to Victorian Public Sector Information and Data it is stated that open access that provides wide opportunities for access to information should become part of the effort to improve human participation and civic engagement.[318]

The external benefit under the human rights theory provides justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

313 'Declaration of the Committee of Ministers on Human Rights and the Rule of Law in the Information Society 2005' (2005) *Council of Europe*, <https://wcd.coe.int/ViewDoc.jsp?id=849061> (at 26 February 2010).

314 The International Commmission for the Study of Communication Problems, 'One Voices, One World' (UNESCO, 1980). See also, Hamid Ibrahim, 'People's Right to Information' (2009) 6 *Aliran Monthly*, <http://aliran.com/1069.html> (at 5 May 2010).

315 Intellectual Property Watch, 'Experts Debate Access to Knowledge' (2005), <http://www.ip-watch.org/weblog/2005/02/15/experts-debate-access-to-knowledfge/?re...> (at 25 March 2010).

316 Deakin University, above n 165, 7.

317 Ibid 5.

318 Ibid 7.

2.3 SUMMARY

Based on the examination of the economic, innovation, public good, social justice and human rights theories and the arguments that support the benefits underlined by those theories, it could be summarised that enabling open access to and re-use of publicly funded research data is beneficial to the society at large. The external benefits of open access and re-use underlined by the above theories provide a strong justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

In terms of the benefit of open access and re-use under economic theory, Malaysia is shifting its focus from a production economy to a knowledge-based economy in order to remain competitive in years to come.[319] The World Bank in its 2007 report on "Malaysia and the Knowledge-Based Economy" recommends that a total transformation into a knowledge-based economy requires the Malaysian Government to think creatively about models of governance for the production, dissemination and utilisation of information and knowledge among its members of society.[320] In this context, the role of open access should be considered. Enabling open access to and re-use of publicly funded research data in Malaysian public universities could enhance knowledge dissemination and information among its members of society.

As far as the benefit of open access and re-use under innovation theory is concerned, the Malaysian government is fully aware that research and innovation are of key importance in order to be economically competitive.[321] The Malaysian New Economic Model, which was introduced in 2010, aims to create a new generation of knowledge workers who can use their ideas to bring about innovations.[322] In order to

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319 Economic Planning Unit, 'Knowledge Content in Key Economic Sectors in Malaysia Phase II' (Government of Malaysia, 2009); Economic Planning Unit, 'Third Outline Perspective Plan 2001-2010' (Government of Malaysia, 2001) 119; Hans-Dieter Evers, 'Transition Towards a Knowledge Society: Malaysia and Indonesia in Comparative Perspective' (2003) 2(2) *Comparative Sociology* 360.

320 Anonymous, 'Human Development Sector Reports East Asia and the Pacific Region - Malaysia and the Knowledge Economy: Building a World-Class Higher Education System' (The World Bank, 2007) xxii.

321 Darshini Kandasamy, 'PM: Innovation is Key to Propel Malaysia Forward', *Malay Mail* (online), 20 July 2010, <http://www.mmail.com.my/content/43754-pm-innovation-key-propel-malaysia-forward>.

322 Economic Planning Unit, 'Tenth Malaysia Plan 2011-2015' (The Government of Malaysia, 2010) 43-45; G Sivalingam, 'The Knowledge Push' (2010) *Malaysian Business*,

stimulate the Malaysian public to be more creative and innovative, the Malaysian Government is aggressively promoting a grassroots innovation concept.[323] To encourage grassroots innovation, 14 Ministries collaborate to carry out various programs aimed at tapping into the creative and innovative side of individuals from a wide spectrum of the Malaysian society.[324] The World Bank in its report prepared for the Government of Malaysia in 2007 submitted that Malaysia's quest towards knowledge-based and innovation is likely to be frustrated, unless policies to link the Malaysian firms with universities and research institutes are strengthened.[325] Another report prepared by the World Bank in 2010 suggests that since innovation is a complex undertaking it requires a comprehensive approach, and a policy that facilitates innovation is likely to stand the greatest chance of success.[326]

In terms of the benefits of open access and re-use under public good theory, like most governments in this world, the Malaysian Government strategically financed the public universities' research with the aim of generating more knowledge and information which could be used for public goods.[327] Being a developing nation with relatively limited resources, Malaysia has to ensure the desired results and high rates of return from every investment made in public research. By enabling open access to and re-use of publicly funded research in Malaysian public universities, the benefits of research data can be optimised for greater public goods.

In discussing the benefits of open access and re-use from the perspectives of social justice and human rights theories, as is the case with most democratic countries in the world, Malaysia vigorously upholds the principles of social justice and human rights. The government commitment towards the right to information as a form of social justice is evidenced by the fact that the principle that all citizens need access to information in a just and an equitable manner is duly acknowledged in Malaysian

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<http://sf5mc5ti5v.search.serialssolutions.com/?ctx.ver=Z39.88-2004&ctx_enc=info%> (at 24 August 2010).

323 'Malaysia Inovatif 2010' (2010) *Ministry of Science, Technology and Innovation*, <http://www.malaysiainovatif.gov.my/> (at 4 October 2011).

324 Anonymous, 'Programmes to Create an Innovative Society', *The Star* (online), 18 January 2010, <http://thestar.com.my/news/story.asp?file=/2010/1/18/nation/5493723&sec=nation>.

325 Anonymous, above n 320, xxii.

326 Philip Schellekens, Yue Li and Ashley Taylor, 'Malaysia Economic Monitor : Growth Through Innovation' (The World Bank, 2010) 12, 85.

327 Ministry of Higher Education Malaysia, above n 111, 30.

National Information Technology Agenda.[328] Despite the Malaysian government's recognition of the right to information, there remains a wide gap in terms of distribution of knowledge and information in Malaysia. The Malaysian Economic Planning Unit reports that knowledge content and innovation are concentrated in a few regions with higher population density, with three of the most developed areas in Malaysia having relatively higher concentrations of knowledge content and innovation. At the same time, the less developed states in Malaysia have relatively low levels aggregate of knowledge content and innovation.[329] The above report implies the existence of an information gap in Malaysia. This gap exists despite the Malaysian Government's efforts in reducing the digital divide by increasing the internet and broadband penetration rate around the country.

In relation to the benefit of open access and re-use from the perspective of human rights theory, Malaysia is a signatory of the United Nations Universal of Human Rights. Therefore, the Malaysian government has an obligation to uphold the principles of human rights. The Malaysian Parliamentary debate in 2010 affirms that a citizen's right to information is guaranteed, so long as it does not violate any laws.[330] One of the most effective ways of empowering a citizen's right to information is by enabling open access to and re-use of publicly funded research data which contains a wealth of knowledge and information.

In summary, regardless from which theoretical perspective the benefits of enabling open access to and re-use of publicly funded research data is viewed, the external benefits as outlined by the economic, innovation, public good, social justice and human rights theories, provide a strong justification to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

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328 'National IT Agenda - NITA' (2009) *The National IT Council*, <http://www.nitc.my/index.cfm?&menuid=49> (at 26 March 2010).

329 Economic Planning Unit, above n 319, 86.

330 Anonymous, 'People's Right to Information Guaranteed', *Bernama* (Online), 8 April 2010, <http://www.bernama.com/bernama/v5/newsgeneral.php?id=488917>.

CHAPTER 3
INVESTIGATING THE INTERNAL BENEFITS OF OPEN ACCESS AND RE-USE

3.1 OVERVIEW

This chapter is the second part of a two-chapter series which serves to answer the first research question: Why should publicly funded research data become a subject of open access and re-use? While the theories which were examined in Chapter 2 underline the external benefits of enabling open access to and re-use of publicly funded research data, some are very sceptical and argue that it is often not in the universities' interest to do so. Sceptics argue that sharing of research data may carry a lot of external benefits to the society at large, but few of the benefits and most of the burdens fall to the universities as owners or providers of the research data.[331] They also argue that while open access to and re-use of research data could be enjoyed by anyone with access to internet for free, much of the cost for sharing the research data falls on the data producers and data providers.[332]

The above arguments have raised challenging questions as to why the Malaysian public universities should enable open access to and re-use of publicly funded research data created by their researchers, when it will benefit others? Similarly, why should university researchers make their research data freely available instead of securing economic gain through intellectual property rights or at least exploiting their research findings to gain academic prestige for themselves?.[333] To answer the above questions, it is the objective of this chapter to examine the internal benefits of enabling open access to and re-use of publicly funded research data. The internal benefits are those benefits that would enhance the organisation's own work, efficiency or objectives in some particular way or form.[334]

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331 See Committee on National Statistics, 'Issues and Recommendations' in Stephen E Fienberg, Margaret E Martin and Miron L Straf (eds), *Sharing Research Data* (National Academy Press, Washington DC, 1985) 17; Joe Shelby Cecil and Eugene Griffin, 'The Role of Legal Policies in Data Sharing' in Stephen E Fienberg, Margaret E Martin and Miron L Straf (eds), *Sharing Research Data* (Washington DC, 1985) 148.

332 Piwowar, Day and Fridsma, above n 228, e308.

333 Ralph Schroeder, 'e-Research Infrastructures and Open Science: Towards a New System of Knowledge Production?' (2007) 25(1) *Prometheus* 13; Doyle, above n 27, 949.

334 Antti Halonen, above n 81.

Rather than enforcing a mandatory policy to silence the sceptics, the advocates of open access to and re-use of research data need to articulate the internal benefits of open access and re-use, particularly to universities and university researchers. In this way, both universities and university researchers will be persuaded by the benefits of open access and re-use rather than being intimidated by the consequences of not doing so.[335] It was argued that successful policies are implemented through expectations, education, incentives and assistance, not coercion.[336] Universities as well as university researchers should be made to understand that in enabling open access to and re-use of publicly funded research data, they are undertaking the dual roles as data providers and data users. Therefore, the internal benefits of enabling open access to and re-use of publicly funded research data could be enjoyed by university and university researchers in both ways (as data providers as well as data users). While the internal benefits of enabling open access to and re-use of publicly funded research data could be numerous, the most common benefits to universities are hereby examined below. Although the objective of this chapter is to investigate the internal benefits of enabling open access to and re-use of publicly funded research data, the implications of not doing so are also highlighted.[337]

3.2 BENEFITS TO THE UNIVERSITIES

3.2.1 Overcoming the Accessibility Problem Faced by University Researchers

It is very common for the research data which was created from public funds to be published in a research journal, which is accessible either by subscription to print journal, electronic database or a society membership.[338] Access to research data published in research journals is becoming more expensive as journal prices keep

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335 Jake Carlson, Alexis E Ramsey and J David Kotterman, 'Using an Institutional Repository to Address Local-Scale Needs: A Case Study at Purdue University' (2010) 28(1) *Library Hi Tech* 155.

336 Suber, above n 1, 87.

337 Among the implications are higher research costs; lost of opportunity costs; barriers to innovation; less effective scientific cooperation and education; and sub-optimal quality of data. See Roberta Balstad, 'The Status of Access to Scientific Data' (2011) *An International Symposium - The Case for International Sharing of Scientific Data: A Focus on Developing Countries*, <http://sites.nationalacademies.org/PGA/biso/PGA_061353> (at 20 April 2011).

338 Danny Kingsley, 'Open Access Publishing: A Solution to the Serials Crisis?' (2006) (March) *Australasian Science* 34.

rising and library budgets are limited. In one study, it was reported that subscription of peer-reviewed research journals requires annual university library acquisition costs of about £200 million.[339] As a result, each university can only afford to subscribe to a small portion of the approximately 24,000 peer-reviewed research journals that exist worldwide and which publish about 2.5 million articles per year.[340]

This affordability problem has resulted in a serial crisis, a situation where the cost of access to research journals has increased faster than inflation.[341] In the UK, it was estimated that between 1998 and 2003 the average price of an academic journal rose by 58%, which was far higher than the UK retail price index which rose by 11% in the same period.[342] The toll access business model practiced by the journal publishers is being largely blamed for the rise of a serial crisis around the world.[343] The universities are directly affected by serial crisis as each university's library is hit with declining budgets and escalating journal prices, and are forced to cancel journal subscriptions.[344]

The serial crisis has created accessibility problems among researchers in universities.[345] In a survey of more than 5000 senior researchers in 2005, it was found that almost 74% thought that high prices made it difficult to access the journal literature. Another study also found that almost half of the 750 researchers surveyed reported having problems gaining access to the resources they needed for their research in medical, biological sciences, arts and humanities.[346] The Universities UK (UUK), in their position statement, have also expressed their concern that the serial crisis has resulted in inefficiency and a restriction over access to publicly funded

339 Bains, above n 2.
340 Harnad et al, above n 31.
341 Bains, above n 2.
342 Charles Oppenheim, 'Electronic Scholarly Publishing and Open Access' (2008) 34(4) *Journal of Information Science* 578.
343 Samuel E Trosow, 'Copyright Protection for Federally Funded Research: Necessary Incentive or Double Subsidy?' (2003) 15, <http://publish.uwo.ca/-strosow/Sabo_Bill_Paper.pdf> (at 12 September 2010).
344 Scherlen and Robinson, above n 278, 58; Trosow, above n 343, 4.
345 House of Commons Science and Technology Committee, 'Science and Technology - Tenth Report' (House of Commons, 2004); Samuel E Trosow, above n 343, 4.
346 John Houghton and Peter Sheehan, 'Estimating the Potential Impacts of Open Access to Research Findings' (2009) 39(1) *Economic Analysis & Policy* 128.

research. These inefficiency and restriction have threatened the UK universities' ability to provide wide and universal access to researchers and students.[347]

The Information Alliance (IAI) report states that while publishers continue to reap the benefit of higher prices (despite fewer subscription), the body of academic research is reaching an ever diminishing audience. In developing countries access to current scientific information by their scientists is further off than ever.[348] A survey conducted by the World Health Organisation (WHO) in 75 countries with annual Gross National Product (GNP) per capita of less than USD1000 found that some 56% of medical institutions had no subscriptions to journals over the last five years. The survey also found that in countries with an annual GNP of USD1000 to USD3000, 34% had no subscriptions and a further 34% had an average of two subscriptions per year.[349]

The accessibility problem caused by the serial crisis increased the risk of excluding large amounts of research data from the world's scientific community.[350] While scientific knowledge is now said to double about every five years, and the rate of scientific papers published grows dramatically with each passing year, up to half the world's published scientific papers are never read by anyone other than their authors, editors and reviewers.[351]

The accessibility problem faced by university researchers has forced the librarians and researchers in the university to look for alternatives to the toll access business model.[352] Part of the solution is through the adoption of open access principles which could overcome both affordability and accessibility problems arising from serial

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347 'Access to Research Publications: Universities UK Position Statement' (2005) *Universities UK*, <http://www.universitiesuk.ac.uk/PolicyAndResearch/PolicyAreas/Documents/Research/OpenAccessUUKPolicyStatementSept2005.pdf> (at 2 March 2010).

348 Trosow, above n 343, 13.

349 Houghton and Sheehan, above n 346, 129.

350 Pritpal S Tamber, Fiona Godlee and Peter Newmark, 'Open Access to Peer-Reviewed Research: Making it Happen' (2003) 362 *Lancet* 1575.

351 Cribb and Sari, above n 296, 1.

352 Richard Wellen, 'Taking on Commercial Scholarly Journals: Reflections on the 'Open Access' Movement' (2004) 2 *Journal of Academic Ethics* 101; Robert Terry, 'Funding the Way to Open Access' (2005) 3(3) *PLoS Biology* e97; Schiltz, Verschraegen and Magnolo, above n 192, 361.

crisis.[353] The objective of open access is partly built upon the need to overcome the accessibility problem faced by university researchers all over the world.[354] Open access removes price barriers (subscriptions, licensing fees, pay per-view fees) and permission barriers (most copyright and licensing restrictions) and enabling open access is estimated to cost only £20 million per year.[355]

The cost saving measures is one of the reasons that leads the fields hardest hit by the serials crisis, such as science, technology, and medicine, to become the early proponents of open access.[356] By adopting open access, the research data can be accessed anywhere by anybody in the world, not just those whose library can afford to subscribe to the journal in which the research data is published.[357] The Science and Technology Committee in their report to the UK House of Commons also recommends open access as an alternative to the toll-access business model. The report recommends that all UK higher education institutions establish institutional repositories in which their published outputs can be stored and from which it can be read, free of charge, online.[358]

The European Research Consortium for Informatics and Mathematics (ERCIM) in its statement supporting open access to research publications, research datasets and software funded by the public through government agencies or charities, has expressed its concern regarding the inability of research libraries to meet the costs of sustaining their collections.[359] The EU has taken a step towards providing an alternative to the toll-access business model by developing Open Access Repository

353 Leslie Chan, 'Supporting and Enhancing Scholarship in the Digital Age: The Role of Open-Access Institutional Repositories' (2004) 29 *Canadian Journal of Communication* 279; Anirbit, 'Free Knowledge Movement' 1, <http://www.theory.tifr.res.in/~anirbit/free.pdf> (at 11 March 2010).

354 Michel Beaudouin-Lafon, 'Open Access to Scientific Publications' (2010) 53(2) *Communications of the ACM* 34.

355 Peter Suber, 'Open Access Overview: Open Access' (2005), <http://www.earlham.edu/~peters/fos/overview.htm> (at 17 August 2010); Bains, above n 2.

356 Carol A Parker, 'Institutional Repositories and the Principle of Open Access: Changes the Way We Think About Legal Scholarship' (2007) 37 *New Mexico Law Review* 38.

357 Wikipedia, above n 282.

358 House of Commons Science and Technology Committee, above n 345.

359 'ERCIM Statement on Open Access' (2006) *European Research Consortium for Informatics and Mathematics*, <http://www.ercim.eu/publication/Ercim_News/enw64/ercim-oa.html> (at 15 March 2010).

Infrastructure for European Research Publications (OpenAIRE) as part of its efforts to improve scientific information access, use and re-use across the EU.[360]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can overcome the accessibility problem faced by university researchers.

3.2.2 Increasing the Visibility, Citation and Impact of University Research

A universally important factor for university research is visibility, citation counts and impact of their research outputs.[361] The benefits of increased visibility and citation is not only beneficial to the individual researcher, but is also beneficial to the university as it extends the reach and accessibility of the university's research activity.[362] For these universities, increased visibility of their research output could vastly improve their academic reputation.[363] In contrast, limiting access to their research output leads to lower visibility and needless loss of research impact for both the researchers and the universities.[364]

Citation counts are also very important when it comes to the university league tables. The higher the citation count the better it is for the university's ranking. For the university's administrator this could be translated into more research funding or even in a greater number of fee-paying overseas students the university can attract.[365] It is clear that boosting research visibility, citation counts and impact is beneficial to the

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360 Ioannidis, above n 210.

361 The term "visibility" refers to the probability that a research output will be seen and disseminated, while "citation counts" "is the number of times someone receives credit in peer-approved publications. "Impact" of the research concerns its long-term reception and the extent to which its findings influence future research and scientific debate. See Johann van Reenen, 'Open Access and Connectedness: Stimulating Unexpected Innovation Through the Use of Institutional Open Archives' (2006) 35(2) *Ciência da Informação, Brasilia* 18; Anonymous, 'Arguments in Favour of Open Access', <http://open-access.net/de_en/general_information/pros_and_cons_of_open_access/arguments_in_favour_of_open_access/> (at 17 August 2010); Steve Fuller, 'The Conundrum of Scientific Fraud' (2006) *Science and Society*, <http://www.project-syndicate.org/commentary/fuller4/English> (at 25 November 2011); Piwowar, Day and Fridsma, above n 228, e308.

362 Bains, above n 2.

363 Kylie Pappalardo et al, 'Understanding Open Access in the Academic Environment: A Guide for Authors' (2008) 13, <http://www.oaklist.qut.edu.au> (at 2 February, 2010).

364 Chan, above n 353, 279.

365 Kingsley, above n 338, 36.

universities. In order for the world to notice and to cite their research outputs, the universities need to find ways to make their work visible to the world a large.[366]

The conventional medium of dissemination of research data is through print publication comprising research journals, books and conference proceeding papers.[367] This conventional medium of dissemination is not designed as a tool for speedy and worldwide dissemination of research data.[368] Since research data is becoming more and more extensive and complex, it is rarely included in the publications themselves.[369] By publishing only in subscription journals, few people have access to the research data which reduces the visibility, citation and impact of the research.[370] As well, inefficient and infrequent means of scientific communications such as annual conferences together with limited participation in international conferences has resulted in the visibility, citation and impact of research suffering a bigger disadvantage.[371]

The size of research data, the high costs of publication and the inefficiency and infrequency of the conventional method of research dissemination, preclude the option for publishing large amount of research data. It is reported that a very small proportion of the research data were published in scientific journals.[372] For research data which is not published it is primarily stored in private files, not in secure institutional repositories and effectively is lost and inaccessible.[373] It is increasingly clear that publishing research data through journal publication offers few effective solutions to increase the visibility, citation rate or impact of research output.[374]

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366 Poschl, above n 299, 26.

367 Ibid.

368 Josh Sommer, 'The Delay in Sharing Research Data is Costing Lives' (2010) 16(7) *Nature Medicine* 744.

369 Peter Suber, 'Open Access to Data', <http://74.6.146.127/search/cache?ei=UTF-8&p=open+access+and+data+manipulation&fr=yfp-t-101&u=open-access.net/de_en/general_information/what_does_open_access_mean/open_access_to_data/&w=open+access+data+manipulation&d=SXLuzO_EUf-M&icp=1&.intl=mye&sig=g8a_cpYSUAUIPW3NkScr9g--> (at 23 March 2010).

370 Parker, above n 356, 7.

371 Serafin Taliyason, 'Knowledge and People: Knowledge Networks 3' (2001) (June) *Business World* 1.

372 Jens Klump et al, 'Data Publication in Open Access Initiative' (2006) 5 *Data Science Journal* 79.

373 Ibid.

374 Stephen E Fienberg, Margaret E Martin and Miron L Straf (eds), *Sharing Research Data* (National Academy Press, Washington DC, 1985) 43.

Many scholars such as Sommer argue that a new medium of research dissemination is required to maximize the pace of research discovery.[375] Joseph Miller who supports open access initiatives to replace the conventional medium of research dissemination argues that compared to the conventional medium, less time elapses between submission and online availability of open access materials. Miller further argues that by depositing scholarship materials in open access journals or open access repositories it will be made available to others immediately.[376] The Portuguese University Rectors in their declaration on open access to scientific publications argue that a university's objective to increase visibility, citation and impact of their research output is best served by enabling open access.[377]

Enabling opening access and re-use is also acknowledged in the Alhambra Declaration on Open Access as a mean to increase the accessibility and visibility of scientific production.[378] Research data which is openly accessible online can be located easily and is immediately available to any interested party from any place which has an internet connection. The fact that the open access materials can be located from any location through internet search engines such as Google and Yahoo, catalogues of digital library or online reference services assures optimal visibility of open access materials.[379]

A study conducted by Froese et al found that online data sharing increased the visibility and impact of research data. They found that more exposure of research data typically results in more visibility, recognition, invitations, citations and projects. [380] Piwowar et al have examined the citation history of 85 cancer microarray clinical trial publications with respect to the availability of their data. Their study

375 Sommer, above n 368,744.

376 Joseph Scott Miller, 'Foreword: Why Open Access to Scholarship Matters ' (2006) 10 *Lewis & Clark Law Review* 735.

377 'Declaration of the Portuguese University Rectors: Open Access to Scientific Publications' (2006) *Council of the Rectors of Portuguese Universities*, <http://www.earlham.edu/~peters/fos/2006/12/open-access-declaration-of-portuguese.html> (at 2 March 2010).

378 'Alhambra Declaration on Open Access 14th May Version' (2010) *Fundacion Espanola Para La Cencia Y La Tecnologia*, <http://oaseminar.fecyt.es/Resources/Documentos/ADeclaration/AD_wd.pdf> (at 2 July 2010).

379 Anonymous, above n 361.

380 Rainer Froese, Domingo Lloris and Silvia Opitz, 'Scientific Data in the Public Domain' 14 *ACP-EU Fisheries Research Report* 267, <http://filaman.uni-kiel.de/ifmgeomar/rfroese/ConcernsDataowners.pdf> (at 11 March 2010).

found that 48% of trials with publicly available microarray data received 85% of the aggregate citations. Publicly available data is significantly associated with a 69% increase in citations, independently of journal impact factor, date of publication, and author country of origin using linear regression. Their research also found that cancer clinical trials which share their microarray data are cited about 70% more frequently than clinical trials which do not.[381] Zeljko Ivezic, from Department of Astronomy, University of Washington reported that as a result of Sloan Digital Sky Survey (SDSS) public data releases, its database has recorded over 300,000,000 web hits in six years with over a million users.[382]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can increase visibility, citation and impact of university research.

3.2.3 Detecting Scientific Fraud by University Researchers

With cases of scientific fraud by university researchers reported to be on the rise in Asia,[383] Europe,[384] and the US,[385] the need to detect scientific fraud has become critical. Scientific fraud by university researchers may include the act of plagiarism,

381 Piwowar, Day and Fridsma, above n 228, e308.

382 Zeljko Ivezic, 'Data Sharing in Astronomy' (2011) *An International Symposium - The Case for International Sharing of Scientific Data: A Focus on Developing Countries*, <http://sites.nationalacademies.org/PGA/biso/PGA_061353> (at 20 April 2011).

383 One of the most cited case of scientific fraud was the one involving a South Korean scientist Prof Woo Suk Hwang from Seoul National University. The professor was found to fake his discovery by falsifying the research data derived from patients suffering from spinal-cord injury and other disorders. See David Cyranoski, 'Woo Suk Hwang Convicted, But Not of Fraud' (2009), <http://www.nature.com.ezp01.library.qut.edu.au/news/2009/091026/full/4611181a.html> (at 14 March 2010).

384 In the UK, the results of a research on triple vaccine to protect against measles, mumps and rubella which was published in February 1998 by Andrew Wakefield in the Lancet was derived from manipulated patients' data. See David Gorski, 'Antivaccine Hero Andrew Wakefield: Scientific Fraud?' (2009) *Science and the Media*, <http://www.sciencebasedmedicine.org/?p=370> (at 25 November 2011). In Germany two German scientists Friedhelm Herrmann and Marion Brach were involved in fabrication of data in scores of peer-reviewed publications over many years See Marco Finetti and Armin Himmelrath, 'German Science Admits to Fraud' (1999) 398 *Nature* 765. In Norway, a scientific fraud by Jon Sudho was discovered and it was later admitted that the data had not come from any database, but from 'thin air'. See Emma Marris, 'Doctor Admits *Lancet* Study is Fiction' (2006) 439(19) *Nature* 248.

385 In the US, Francis Collins, one of the US top genetics researcher, and who is also a director of National Center for Human Genome Research project at NIH discovered that a junior scientist in his lab, fabricated data in a paper that went out for publication under his name. See Eliot Marshall, 'Fraud Strikes Top Genome Lab' (1996) 274(5289) *Science* 908.

submitting work previously submitted to an academic journal, citing false references or providing false, fabricated or altered data to deliberately mislead the public.[386] A survey conducted by Daniele Fanelli on data fabrication and falsification among scientists found that, on average, about two percent (2%) of scientists admitted to having fabricated, falsified or modified data or results at least once. The same survey also reveals that fabrication, falsification and modification of research by their colleagues has been observed by over 14% of respondents and other questionable practices by up to 72% of the respondents.[387]

Among the causes of scientific fraud which have been identified is the failure of journal's peer review system.[388] Richard Horton, the editor of The Lancet admits that the peer review system can only detect badly done research. If the researcher is determined to fabricate entire research, it is not possible for the peer review system to detect it.[389] Emma Maris in her special report on scientific fraud, agrees that the peer review system is not capable of catching fraudulent acts.[390] The repeat incidence of scientific fraud discovered in peer-reviewed journal publication has raised further criticisms about the effectiveness and accuracy of scientific journal's peer review system.[391]

Lack of data replication as a result of a closed access system is also blamed for the rise of scientific fraud. Data replication is seen as an important component of scientific research as it ensures the validity and accuracy of research data.[392] Lack of data replication makes the validation and verification of results difficult, if not impossible.[393] Research data which is kept in a closed access system will result in a substantially small and less diverse scientific community able to validate and verify

386 Fuller, above n 361; Anonymous, 'Academic Fraud and the Honor System', <http://www.virginia.edu/honor/mo/proc/fraud.html> (at 25 November 2010).

387 Daniele Fanelli, 'How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data' (2009) 4(5) *PloS ONE* 8.

388 Daryl E Chubin, 'Research Malpractice' (1985) 35(2) *BioScience* 81.

389 Richard Horton, 'Genetically Modified Food: Consternation, Confusion and Crack-Up' (2000) 172(148) *MJA*, <http://www.mja.com.au/public/issues/172_04_210200/horton/horton.html> (at 25 November 2010).

390 Emma Marris, 'Special Report: Should Journals Police Scientific Fraud?' (2006) 439(2) *Nature* 520.

391 Emma Marris, above n 384, 248; A Carl Leopold, 'The Peer-Review System: Pique and Critique' (1988) 2(13) *Scientist* 12.

392 Panel on Data Access for Research Purposes, 'Expanding Access to Research Data: Reconciling Risks and Opportunities' (National Research Council, 2005) 39.

393 Klump et al, above n 372, 79.

the research data compared to research data that is openly available.[394] By enabling open access to and re-use of research data the potential for scientific fraud can be reduced.[395] In contrast to the closed access system, enabling open access and re-use allows replication, validation and verification of research data. When data is archived and shared openly, research data can be used for re-analysis, which could provide a direct check on reported results, expose errors or inconsistencies of the data analysis.[396]

Klump et al in 'Data Publication in Open Access Initiative' argue that cases of scientific fraud in recent years have made it very important to ensure scientific data is made available online.[397] Peter Suber includes data manipulation and data forgery as among the reasons why open access to the original data is important as the research result can be verified, examined and reproduced.[398] Although open access to and re-use of research data cannot detect scientific fraud as a whole, it could provide a strong deterrence and prevention. Enabling open access to and re-use of research data could reduce or discourage the incidence of faked results and scientific fraud among researchers.[399]

Glyn Moody, a technology journalist and consultant also agrees that open access to data can be used to detect scientific fraud. According to Moody if the "raw data" were made available to all, any manipulation could be detected more readily as open access allows anyone to check for plagiarism. Moody argues that when the research data is out in the open, it is much easier to detect plagiarism or outright fraud. He argues that when public access to research data is restricted there is less likelihood that scientific fraud can be detected.[400]

394 Uhlir and Schroder, above n 125, 201.

395 Sally Murray et al, 'Open Science, Open Access and Open Source Software at Open Medicine' (2008) 2(1) *Open Medicine* E2.

396 See Shearer, above n 30, 5; Fienberg, Martin and Straf (eds), above n 374, 10; Poschl, above n 299, 26.

397 Klump et al, above n 372, 79.

398 Suber, above n 369.

399 Piwowar, Day and Fridsma, above n 228, e308.

400 Glyn Moody, 'On the Necessity of Open Access and Open Data' (2007), <http://opendotdotdot.blogspot.com/2007/08/on-necessity-of-open-access-and-open.html> (at 23 March 2010).

At the organisational level, a report published in 2005 by the US Panel on Data Access for Research Purposes, states that open access to and re-use of research data could help to ensure that data fraud or data misrepresentation can be immediately detected by other researchers.[401] A group of scientific societies and publishers has made a recommendation to the US National Academy of Science (NAS) for research data to be made accessible and archived in open access repositories to allow for replication and consequent studies.[402] In March 2007, twelve prominent universities in the US required scientists who published their research results to make available their published data and conclusions to others for verification.[403] The German Science Foundation and other science organisations have introduced policies which require researchers to archive data used in a publication for a minimum duration of ten years.[404]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can detect scientific fraud by university researchers.

3.2.4 Avoiding Unnecessary Duplication and Repetition of Research Efforts

The continuously growing quantities of research data collected by universities require massive investment of public funds. [405] The duplication and repetition of research efforts, which is a waste of researchers' time, money and energy, is undesirable to both the researchers and the universities.[406] Through data sharing practices, researchers can avoid starting research from scratch and the research data collected over years can be shared within the scientific research community, as well

401 Panel on Data Access for Research Purposes, above n 392, 39.

402 Editorial, 'Ensuring Data Integrity' (2009) 12(10) *Nature Neuroscience* 1205.

403 Those universities are: California Institute of Technology, Cornell University, Harvard University, Massachusetts Institute of Technology, Stanford University, University of California, University of Illinois, Chicago, University of Illinois, Urban-Champaign, University of Washington, Wisconsin Alumni Research Foundation, Yale University and Association of American Medical Colleges. See Anonymous, 'In the Public Interest: Nine Points to Consider in Licensing University Technology' (2007), <http://www.autm.net/Nine_Points_to_Consider.htm> (at 16 January 2010).

404 Klump et al, above n 372, 79.

405 Jens Klump, Joachim Wachter and The STD-DOI Consortium, 'Open Access to Data and the 'Berlin Declaration", <http://www.codata.org/04conf/papers/Klump-paper.pdf> (at 11 October 2010).

406 Ibid.

as the public.[407] In addition, much scientific research data is derived from observations of natural phenomena which are single events that cannot be repeated, such as volcanic eruption or a cyclone. This makes data sharing even more necessary.[408] It is therefore more efficient and cost-effective for university researchers to share research data than to repeat or collect everything the researcher needs independently.[409]

Through data sharing, the same datasets can be used and re-used for multiple purposes without the need for substantial new investments.[410] Research data is no longer considered as an interim product which is disposed of once the research report is published. Research data has become an important source of scholarly content which can used and re-used.[411] By using and re-using research data unnecessary duplication and data collections can be avoided and university researchers can publish more easily, without having to generate original data.[412] Sharing of research data can also avoid the public having to participate in research surveys or interviews repetitively.[413] This will eventually reduce the respondent burden, avoiding survey fatigue, which can improve response rates for other researchers targeting the same respondents.[414]

Velterop cites the benefit of avoiding unnecessary duplication of research data as part of his arguments in support of open access. According to him, open access would make it easier to avoid duplication of research effort and the resulting financial and time waste. It enables the building of open access databases and knowledge-bases, effectively and efficiently re-using published results.[415] Poschl also argues that open access to and re-use of research data could prevent unnecessary

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407 Appraising Science and Technology Records: Disposal Manual Technical Guideline E8 (National Archives Australia).

408 Ibid.

409 Wikipedia, above n 34.

410 Panel on Data Access for Research Purposes, above n 392, 38.

411 Wouter Schallier, 'Primary Data: The New Special Collections for Research Libraries?' (2011), <http://www.casalini.it/retreat/2011_docs/schallier.pdf> (at 8 June 2011).

412 Poschl, above n 299, 6.

413 Hendrick, above n 271, 168.

414 Jenny Fry et al, 'Identifying Benefits Arising From the Curation and Open Sharing of Research Data Produced by UK Higher Education and Research Institutes' (2008) iv, <http://ie-repository.jisc.ac.uk/279/2/JISC_data_sharing_finalreport.pdf> (at 23 March 2010).

415 Jan Velterop, 'Should Scholarly Societies Embrace Open Access (Or Is It the Kiss of Death)?' (2003) 16(3) *Learned Publishing* 169.

duplication of research and data collection 'of the lab next door'.[416] Zeljko Ivezic, an astronomer at Washington University, argues that expensive and limited resources in astronomy research require broad community support to open access to research data.[417]

The ICSU/CODATA Ad Hoc Group on Data and Information in their support for open access to and re-use of research data argue that no individual, institution, or country can collect all the data it needs to address important scientific issues.[418] The Ad Hoc Group points out that as university researchers are both data users and data producers, open access to and re-use of research data are beneficial to them.[419] The US National Research Council Panel on Data Access for Research Purposes reports that open access promotes new research and allows for exploration of new questions without necessitating new data collection.[420]

Two influential publishing associations, the Association of Learned and Professional Society Publishers **(**ALPSP) and the International Association of Scientific, Technical and Medical Publishers (STM) issued a joint statement in 2006 which argues that by allowing as many scientists as possible to have access to as much prior data as possible, costly repetition of work can be avoided.[421] The Canadian Association of Research Libraries (CARL) in their report, "Research Data: Unseen Opportunities" argues that when dataset is publicly available it can avoid expensive and needless data collection or production activities.[422] In China, a new platform of data sharing which allows data to be freely shared among scientists has been introduced to help deal with chronic duplication and lack of funding in scientific research in China.[423]

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416 Poschl, above n 299, 26.

417 Ivezic, above n 382.

418 ICSU/CODATA Ad Hoc Group on Data and Information, above n 17.

419 Ibid.

420 Panel on Data Access for Research Purposes, above n 392.

421 'Databases, Data Sets, and Data Accessibility – Views and Practices of Scholarly Publishers: A Statement by the Association of Learned and Professional Society Publishers (ALPSP) and the International Association of Scientific, Technical and Medical Publishers (STM)' (2006) *ALPSP and STM*, <http://www.stm-assoc.org/documents-statements-public-co/stm-alpsp%20data%20statement.pdf> (at 28 February 2010).

422 Shearer, above n 30, 5.

423 Xinhuanet , 'New Platform for Scientific Research', <http://english.itpcas.cas.cn/ns/ln/200407/t20040723_21312.html> (at 23 March 2010).

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can avoid unnecessary duplication and repetition of research efforts.

3.2.5 Facilitating University's Participation in Research Collaborations

Research collaborations are an interactive process where two or more researchers or research organisations work together towards common objectives, by sharing data and information using research networking tools.[424] As the 21st century is plagued with global crisis, disease and climate change, university research cannot be conducted within the outdated silo research model. To find solutions to global problems, it is necessary for university researchers to collect and analyse data and information from all parts of the world.[425] University researchers need to collaborate with other researchers from multidisciplinary and interdisciplinary disciplines and across distinct institutional boundaries.[426]

The multiple disciplines and institutions involved in collaborative research are linked by their need to access the same databases. Research data produced by one research discipline may be needed for research in other disciplines.[427] The need to share data among the researchers has resulted in collaborative research becoming data-driven at a scale previously unimagined.[428] The data-driven research has created a new paradigm of data-intensive science, described by Jim Gray as the 'Fourth Paradigm.[429] This data intensive science requires data to be openly shared with

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424 David Bicknell, 'Collaboration Drives Innovation' (2009) (Apr 28 - May 4) *Computer Weekly* 14.

425 See Committee on Geophysical and Environmental Data National Research Council, 'On the Full and Open Exchange of Scientific Data' (National Research Council, 1995); Angus Whyte and Jonathan Tedds, 'Making the Case for Research Data Management' (2011) *DCC Briefing Papers*, < http://www.dcc.ac.uk/resources/briefing-papers/> (at 2 October 2011).

426 See Francine Berman and Henry E Brady, 'Workshop on Cyberinfrastructure for the Social and Behavioral Sciences: Final Report' (National Science Foundation, 2005) 57; Benkler, above n 148, 65.

427 MGK Menon, 'Introduction by Symposium Chair' (Paper presented at the International Symposium on Open Access and the Public Domain in Digital Data and Information for Science 2004, Washington D.C., 2004).

428 See John Markoff, 'Books on Science: A Deluge of Data Shapes a New Era in Computing', *New York Times (online)* (New York), 15 December 2009, <http://www.nytimes.com/2009/12/15/science/15books.html>.

429 See Hey, Tansley and Tolle (eds), above n 8.

members of collaborative research.[430] Data intensive science has fuelled the emergence of a new generation of international collaborative scientific research known as e-Science. Being data intensive science, e-Science requires access to very large data collections and open and immediate sharing of data and information.[431] Researchers who want to participate in e-Science need to deposit their research data online and share it with other researchers regardless of disciplines and boundary.[432]

International research collaborations such as e-Science have pushed open access to and re-use of research data in the mainstream of research activities.[433] The Atkin's Report on Revolutionising Science and Engineering Through Cyberinfrastructure states that wider and easier access to reports, raw data and instruments is needed in e-Science.[434] To facilitate international research collaborations the Human Genome Organisation (HUGO) and UNESCO require scientific data to be open for free access and exchange of information.[435] The American Council of Learned Societies Commission on Cyberinfrastructure for the Humanities and Social Sciences reports that open access is required not only in scientific research but also in humanities and social sciences.[436] The researchers in the field of social science and humanities who participate in e-Research also require access to large data collections.[437] The e-Research is an online research collaboration in social science and humanities

430 Michael L Nelson, 'Data-Driven Science: A New Paradigm?' (2009) 44(4) *Educause* 6.

431 Jenny Fry, Ralph Schroeder and Matthijs des Besten, 'Open Science in e-Science: Contingency or Policy?' (2009) 65(1) *Journal of Documentation* 7.

432 See Harvey B Newman, Mark H Ellisman and John A Orcutt, 'Data-Intensive e-Science Frontier Research in the Coming Decade' (2003), <http://ultralight.caltech.edu/web-site/common/publications/article/2003/200311ACM/CACM.eScience.Revised_FINAL080803.pdf> (at 20 June 2011); Neil Rambo, 'E Science and Biomedical Libraries ' (2009) 97(3) *Journal of the Medical Library Association* 159.

433 Fry, Schroeder and des Besten, above n 431, 7.

434 Daniel E Atkins et al, 'Revolutionizing Science and Engineering Through Cyberinfrastructre: Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure' (National Science Foundation, 2003) 17, 28.

435 Beatrice Godard et al, 'Data Storage and DNA Banking for Biomedical Research: Informed Consent, Confidentiality, Quality Issues, Ownership, Return of Benefits. A Professional Perspective' (2003) 11(Suppl 2) *European Journal of Human Genetics* S96.

436 John Unsworth et al, 'Our Cultural Commonwealth: The Report of the American Council of Learned Societies Commission on Cyberinfrastructure for the Humanities and Social Sciences' (American Council of Learned Societies Commission, 2006) 29,30.

437 'What is eResearch?' *Griffith University*, <http://eresearch.griffith.edu.au/node/102?q=content/what-eresearch> (at 9 March 2010); 'What is eResearch?' *eResearch SA*, <http://www.eresearchsa.edu.au/whatis> (at 9 March 2010).

disciplines.[438] eResearch SA, an organisation comprising of three universities in South Australia emphasises the need for continued access to data and the ability to make data available for re-use by other researchers as among the core features of e-Research.[439]

In light of the growing importance of international research collaborations, open access to data networks forms a critical part of the emerging infrastructure for global research collaborations.[440] University researchers who want to participate in research collaborations need to embrace the culture and norms of open access.[441] In order to take part in research collaborations, a university and its researchers must be willing to contribute and share their research data as widely and as openly as possible. Participation in research collaborations is not possible if a university or its researcher is not willing to share or make available research data online.[442]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can facilitate university's participation in research collaborations.

3.2.6 Preserving the Academic Mission of Public Universities

In recent years, the public research funding agencies in many countries have introduced policies adopted from the US Bayh-Dole Act that encourage patenting and commercialisation of publicly funded research.[443] Like the US Bayh-Dole Act, these policies allow university researchers to patent and commercialise publicly funded research outputs and to get a percentage of royalties that the commercialised

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438 Christine L Borgman, 'Disciplinary Differences in e-Research:An Information Perspective' (Paper presented at the International Conference on e-Social Science 2005, Manchester, UK, 2005); Anne-Sofie Axelsson and Carina Carlhed, 'Next Generation e-Researchers: Doctoral Students in Social Sciences and Humanities in Sweden and their Attitudes Towards Open Access and Open Repositories' (Paper presented at the International Conference on e-Social Science 2005, Manchester Conference Centre, 22 - 24 June 2005); Grahame Pearson, 'e-Research @ UNE' (2008), <http://www.une.edu.au/research-services/eresearch/e-Research-UNE-presentation.pdf> (at 9 March 2010).

439 'What is eResearch?', above n 437.

440 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

441 See Arzberger et al, above n 127, 1778; Barbara Kirsop and Leslie Chan, 'Transforming Access to Research Literature for Developing Countries' (2005) 31(4) *Serials Review* 247.

442 Uhlir and Schroder, above n 125, 200.

443 Shulman, above n 145, 9; Uhlir and Schroder, above n 125, 191.

patents generate.[444] Merrill and Mazza claim that patenting and commercialisation of academic research undermines the traditional mission of public universities which includes free and wide dissemination of knowledge to the public. They also claim that the academic mission of the public universities is under threat and they experience deleterious effects due to patent and commercialisation of academic research.[445] Academicians in public universities were urged to balance their role as educators and researchers who create and share knowledge with the public with their role as innovators who patent and commercialise their innovations.[446]

Patenting and commercialisation of academic research is also blamed for the erosion of the academic commons and the 'social gift economy' in the university. Under the 'social gift economy' system, university researchers share their research results without asking for money or using legal contracts or other market mechanisms.[447] The incentives given to university researchers to patent and commercialise their patents have led to the culture of "private world of patents" to dominate "open public world of science".[448] Free and wide dissemination of academic research outputs through conferences, informal networking and publications by university researchers becomes more guarded and delayed as the researchers compete to patent and commercialise their research outputs.[449]

Sampat cautions that though there is too little systematic data to permit empirical assessment of the extent and seriousness of secrecy and non-disclosure *en route* to patent and commercialisation, it is a matter that should not be casually dismissed for want of conclusive evidence.[450] There is in fact ample evidence showing that a university's participation to patent and commercialise university research is significantly associated with delays in publication as well as data withholding and

444 Tom Coupe, 'Science is Golden: Academic R&D and University Patents' (2003) 28 *Journal of Technology Transfer* 31.

445 Merrill and Mazza (eds), Stephen A Merrill and Anne-Marie Mazza (eds), *Managing University Intellectual Property in the Public Interest* (The National Academic Press, 2010), 22.

446 See Powell and Owen-Smith, above n 156, 273; Mowery and Sampat, above n 158.

447 David Bollier, above n 137, 19.

448 See Christie et al, above n 159, 48.

449 Nathaniel B Lipkus, Jocelyn E Mackie and Peter A Singer, 'Guidance for Reconciling Patent Rights and Disclosure of Findings at Scientific Meetings' (2010) 8(15) *Health Research Policy and Systems* 2.

450 Sampat, above n 147, 784.

secrecy.[451] A US national survey found that faculty who were more likely to withhold data from others are those who engaged in commercial activities, having applied for a patent or had a patent issued or licensed.[452]

There is also evidence that patenting university research has a negative impact on publication quantity and quality.[453] In 2008, Huang and Murray examined 4,270 human gene patents and found that patent strategies in the area of human genetics resulted in decreases in the amount of published knowledge.[454] In another study conducted in 1997, it was reported that out of some 2000 academic life sciences surveyed, 79 percent acknowledged that they had delayed disclosing new information in order to apply for patents or secure some other kind of intellectual property protection for their work.[455] Lipkus et al found that the risk of forfeiting rights to a patent through careless disclosure can lead scientists to purposely hide their discoveries to preserve their economic rights.[456]

In a study conducted by Grushcow, it was found that scientists who eventually patent their work appear to withhold disclosure of their data at scientific conferences for periods of months, or even years, and that academic and publicly funded scientists who were not seeking a patent disclosed their abstracts over a year earlier than scientists who were seeking patents. Another study finds that secrecy is on the rise among academic researchers (particularly those in the life sciences), due to a desire to participate in patenting and technology transfer.[457]

The US National Research Council's Subcommittee on Sharing Research Data led by Stephen Fienberg reports that the development of a patentable product or process from a research effort may affect the willingness of researchers to disclose their research data.[458] The UK Royal Society of Science in its report finds evidence that

451 Christie et al, above n 159, 72.
452 Eric G Campbell et al, 'Data Witholding in Academic Medicine: Characteristics of Faculty Denied Access to Research Results and Biomaterials' (2000) 29 *Research Policy* 303.
453 Dirk Czarnitzki, Wolfgang Glanzel and Katrin Hussinger, 'Heterogeneity of Patenting Activity and its Implications for Scientific Research' (2009) 38 *Research Policy* 33.
454 Merrill and Mazza (eds), above n 445, 38.
455 Shulman, above n 145, 12.
456 Lipkus, Mackie and Singer, above n 449, 1.
457 Ibid.
458 Committee on National Statistics, above n 331, 21.

patenting can encourage a climate of secrecy that does limit the free flow of ideas and information that are vital for successful science.[459] The Royal Society of Science has made the following comments pertaining to patent and its effect on free flow of scientific information:

> Patents can provide valuable, although sometimes expensive, protection for inventions. They therefore encourage invention and exploitation, but usually limit competition. They can make it impracticable for others to pursue scientific research within the areas claimed, and because inventions cannot be patented if they are already public knowledge, they can encourage a climate of secrecy. This is anathema to many scientists who feel that a free flow of ideas and information is vital for productive research. Additionally, research by others may be constrained by patents being granted that are inordinately broad in scope – a particular risk in the early stages of development of a field. This is bad for science and bad for society. [460]

For research areas in which commercial applications are inherent or desirable, there will be additional motivations for the researcher to keep the data private and under conditions of secrecy, at least until patent rights are secured.[461] In a survey published in 2001 by Thursby and Thursby, it is found that half of the firms sponsoring research commercialisation at universities sought to include publication delay clauses in 90 percent of their contracts.[462] Seth Shulman cites a survey conducted by Huang and Murray, which reports that one-fifth of the respondents in their survey admit that, for commercial reasons, they delayed publication of their data for more than six months, and in some cases keeping it secret indefinitely.[463]

A survey by Walsh et al also reports denial of access to research findings and that this was related to commercial competition. Their survey reports that about half of the academic respondents had had at least one request for data and information sharing denied over a two-year period.[464] The OECD has also expressed their worry

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459 Royal Society Working Group on Intellectual Property, 'Keeping Science Open: The Effects of Intellectual Property Policy on the Conduct of Science' (Royal Society, 2003) v.

460 Ibid.

461 Uhlir and Schroder, above n 125, 207.

462 Jerry G Thursby, Richard Jensen and Marie G Thursby, 'Objectives, Characteristics and Outcomes of University Licensing: A Survey of Major U.S. Universities' (2001) 26 *Journal of Technology Transfer* 59.

463 Shulman, above n 145, 12.

464 Merrill and Mazza (eds), above n 445, 45.

that commercialisation of research output might foster growing competition and a tendency for secrecy in scientific work. According to the OECD, patent commercialisation requires secrecy, whereas universities should play their role in diffusing and divulging research results.[465]

The NIH Deputy Director, Daryl Chamblee, in his testimony before the US Senate, acknowledged his concern that commercial aims might stifle free exchange of knowledge in the academic community, promote secrecy and distort research priorities.[466] An article written by Lemley claims that universities are now becoming patent trolls, whereby universities are filing patent protection for patent hold-up and rent-seeking. According to Lemley, being a patent troll, universities treat patent licensing as a source of revenue, preferring exclusive licensing over non-exclusive licensing, if exclusive licensing is capable of generating more income.[467]

In discussing the various channels through which university researchers may share their research results, the US National Academies, Committee on Management of University Intellectual Property argues that free exchange of information is critical and, relatively, a more important channel of knowledge and technology transfer than commercialisation.[468] For David Bollier, the introduction of open access policy to publicly funded research is so desirable at a time when academic commons, the culture of gift and the public-spirited ethic of the academia, has been replaced by an acquisitive ethic that actively seeks patent ownership and commercial profit from the fruits of publicly funded university research.[469]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can preserve the academic mission of universities from being undermined by academic patenting and commercialisation of academic research.

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465 Anna Salleh, 'Australia to Gain from Open Access to Research' (2008) *ABC Science Online*, <http://www.abc.net.au/news/stories/2008/09/25/2374371.htm> (at 2 February 2010).

466 Blumberg, above n 152, 91.

467 Mark A Lemley, 'Are Universities Patent Trolls?' (2008), <http://iplj.net/blog/wp-content/uploads/2009/09/Article-ARE-UNIVERSITIES-PATENT-TROLLS.pdf> (at 15 January 2010).

468 Merrill and Mazza (eds), above n 445, 31.

469 Bollier, above n 137, 18.

3.2.7 Promoting the Norms of Open Science Among University Researchers

The term "open science" is borrowed from the sociology of science which describes a process of free and open inquiry in science.[470] The ideal of open science is built upon the belief that science should be freely available and that private interests should not stymie its use.[471] The "openness" of open science suggests that science is best served by a system of minimal restraints in order to allow optimal transfer of knowledge.[472] One important aspect of open science is in respect of disposition and disclosure of scientific findings and methods through formal and informal data and information exchange.[473] The conduct of open science requires scientific data and information to be disclosed to the public, which enables the efficient growth of knowledge.[474]

Scientific research has long been viewed as an open science process that requires scientists to make their scientific data and information available to others.[475] The knowledge sharing principle becomes the norm of open science and is premised upon the assumption that producers of scientific knowledge will contribute their knowledge voluntarily and unconditionally to the scientific commons. The knowledge sharing principle under the norms of open science reflects the belief that science depends not on individual advances alone but also on the sharing and elaborating of information, ideas, and research.[476] The norms of open science

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470 James Boyle, 'Mertonianism Unbound? Imagining Free, Decentralized Access to Most Cultural and Scientific Material' (Paper presented at the Workshop on Scholarly Communication as a Commons, Indiana University, Bloomington, March 31-April 2 2004) 2.

471 Murray et al, above n 395, E1.

472 Committee on Scientific Planning and Review, above n 29.

473 Paul A David, 'The Economic Logic of "Open Science" and the Balance between Private Property Rights and the Public Domain in Scientific Data and Information: A Primer' (Paper presented at the National Research Council Symposium on the Role of the Public Domain in Scientific and Technical Data and Information, Washington DC, 2003).

474 Paul A David, 'Mitigating "Anticommons" Harms to Research in Science and Technology: New Moves in "Legal Jujitsu" against Adverse Consequences of the Eploitation of IPR on Publicly and Privately Funded Research Results' (2010) *SIEPR Discussion Paper 10-009* 1, <http://siepr.stanford.edu/system/files/shared/pubs/papers/pdf/10-030_Paper.pdf> (at 6 January 2011).

475 Schiltz, Verschraegen and Magnolo, above n 192, 360; Judith Hurwitz and Marcia Kaufman, 'Leveraging Information for Innovation and Competitive Advantage' (Hurwitz and Associates, 2007) 2.

476 Diana Rhoten and Walter W Powell, 'The Frontiers of Intellectual Property: Expanded Protection versus New Models of Open Science' (2007) 3 *Annual Review of Law & Social Science* 347.

requires scientific data and information to be open to all persons of "competence", regardless of their personal attributes.[477]

Complying with the norms of open science has been one of the reasons for researchers to share their research data and information.[478] While many scientists believe that research data should be promptly disclosed and shared among the research communities under the norms of open science, it seems that not all of them believe it. The norms of open science are often breached, as evidenced by reports of data withholding among researchers which occurs in two ways: delayed publication or refusing direct requests from other investigators to access and re-use the research data.[479] Sommer observes that in the life sciences research discipline, it is still the norm for research data to be published years after it is generated or sometimes not at all and to be safeguarded until publication.[480]

Shulman in a survey of 1,240 geneticists reports that 73 percent of the scientists said that the withholding of data slowed progress in their field. Nearly half of the scientists stated that their colleagues' refusal to share data or materials had adversely affected their own research and the education of their students. It was also reported that another 28 percent stated that the decline in information had prevented them from independently confirming published research, a key requisite for the advancement of any scientific field.[481] Campbell et al in their study on delayed publication cite research conducted in 1997 by Blumenthal et al regarding the issue of delayed publication and data withholding in the universities. Blumenthal et al found that 19.8% of academic researchers in life sciences had delayed publication of their results by more than 6 months, and 8.9% had denied a request from another university scientist for access to research results.[482]

Vogeli et al reported a 2003 study by Blumenthal et al conducted in the US. In the study, 1,077 second-year doctoral students and postdoctoral fellows in life sciences at 50 US universities were surveyed on the exposure to and the consequences of data

477 David, above n 473.
478 Borgman, above n 140.
479 Campbell et al, above n 452, 303.
480 Sommer, above n 368, 744.
481 Shulman, above n 145, 2.
482 Campbell et al, above n 452, 303.

withholding. It was found that two hundred forty-six trainees reported that they had asked for and been denied access to information, data, materials or programming associated with published research and 221 to unpublished research. Eighty-five trainees reported that they had denied another academic scientist's request(s) related to their own published research. [483]

In another study published in 2006 by Blumenthal et al, 2,893 geneticists and other life scientists at the 100 most research-intensive universities in the United States were surveyed concerning data withholding and sharing. Forty-four percent of geneticists and 32% of other life sciences scientists reported participating in data withholding in the three previous years whereby delayed publication was the most frequent one.[484] A 2010 study by O'Donnell, Supp and Cobbold of publications in 14 journals in fields of biology, found a median submission delay (time from last data collection to submission of manuscript) of 168-169 days.[485] The problem is not only prevalent in the US. It was also reported in the UK where it was found that scientists' attempts to obtain raw data had been delayed and denied.[486]

The incidence of data withholding clearly works against the norms of open science. Murray et al argue that open science is inextricably linked to the parallel movements of open access as open science encourages the collaborative re-use and re-analysis of existing data.[487] Azberger et al have also linked open access to and re-use of publicly funded research data to the norms of open science.[488] Miller also argues that enabling open access could counteract the tendency for data withholding which upsets the norms of open science.[489]

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483 C Vogeli et al, 'Data Withholding and the Next Generation of Scientists: Results of a National Survey' (2006) 81(2) *Academic Medicine* 128.

484 D Blumenthal et al, 'Data Withholding in Genetics and the Other Life Sciences: Prevalences and Predictors.' (2006) 81(2) *Academic Medicine* 137.

485 Ryan P O'Donnell, Sarah R Supp and Stephanie M Cobbold, 'Hindrance of Conservation Biology by Delays in the Submission of Manuscripts' (2010) 24(2) *Conservation Biology* 615.

486 Doug Keenan, 'Another UK Climate Data Withholding Scandal is Emerging', <http://wattsupwiththat.com/2009/08/14/another-uk-climate-data-scandal-is-emerging/> (at 15 March 2010).

487 See, Murray et al, above n 395, E1.

488 Arzberger et al, above n 127, 1777.

489 Miller, above n 376, 735.

Cribb and Sari who published a report on open science and sharing of knowledge in the global century were of the view that there is a need to make science a more open and democratic activity by encouraging openness, transparency, and equity in the distribution of knowledge information.[490] Their arguments are consistent with the findings made by Bluementhal et al who, after a series of studies on the syndrome of data witholding, conclude that encouraging openness is critical to increase data sharing.[491] Further support could be found in the OECD report that states the public science system requires a policy which could affect the degree to which research data is made accessible and used.[492]

It is clear that enabling open access to and re-use of publicly funded research data is beneficial to the Malaysian public universities as it can promote the norms of open science among university researchers.

3.3 SUMMARY

With all the internal benefits that have been examined above, enabling open access to and re-use of publicly funded research data should be desirable to the Malaysian public universities. Although no research has been conducted so far on the problem of accessibility problem among university researchers in Malaysia, no one can claim that the Malaysian public universities are not affected by the toll-business model practiced by traditional publishers. As the libraries of Malaysian public universities also subscribe to toll-access journals, the researchers in Malaysian public universities inevitably will face accessibility problems.

As far as the visibility, citation and research impact are concerned, the World Bank Report submitted to the Government of Malaysia states that the Malaysian research output is poorly cited in other countries. This is an indication that the Malaysian research output is not visible to others, hence reducing its impact. It is also reported that the Malaysian public universities' low rating in the Shanghai Jiao Tong University (SJTU) and the Times Higher Education Supplement (THES) world

490 Cribb and Sari, above n 296, 12-13.
491 Blumenthal et al, above n 484, 137.
492 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.

universities ranking, is primarily due to the low scores they received on the "Citations/Faculty" indicator. The report also attributes the drop in Malaysian public universities ranking in 2005 from the previous year to extremely low scores obtained on two indicators – peer review and citations per faculty.[493] In various world university ranking exercises, among the most important indicators used is the university's research productivity, peer review, citation and the impact of the university's publications.

With regard to visibility of the universities' database, it is also found that the Malaysian public universities score a very low visibility rating. In world repositories ranking, only five out of 20 public universities from Malaysia could make it into the top 800.[494] The visibility of the websites of Malaysian research universities i.e. the University of Science Malaysia (USM), Malaysian University of Technology (UTM), Putra University of Malaysia (UPM), University of Malaya (UM) and National University of Malaysia (UKM) is also reported as very low. The USM, UTM, UPM, UM and UKM are ranked at 1039, 1330, 1423, 1218 and 1312 in terms of visibility of their websites.[495] As the Malaysian public universities are eyeing greater international recognition both at national and international levels, enabling open access and re-use of their research data which can increase visibility, citation and research impact, is beneficial to the universities.[496]

Regardless of the fact that no incidence of scientific fraud by researchers in Malaysian public universities has been found to date, the possibility that scientific fraud occurs in the public universities should not be dismissed. The fact is that while there is no policy enabling open access to and re-use of research data in Malaysian public universities the risks of scientific fraud could increase. In the absence of policy that enables open access to and re-use of publicly funded research data in Malaysian public universities, it can also be anticipated that waste of university

493 Anonymous, above n 320, 139-141.

494 Anonymous, 'Ranking Web of World Repositories: Top 800 Repositories' (Cybermetrics Lab, 2010).

495 Anonymous, 'Ranking Web by Country: Top Colleges and Best Universities of Malaysia' (Cybermetrics Lab, 2010).

496 It was reported that, the enlargement of access to Harvard University produced knowledge further strengthens the status of the institution as the leading university in the world. See Marginson, above n 251, 9.

resources through unnecessary duplication of research or repetition of data collection among university's researchers may also occur.

As far as a university's participation in research collaboration is concerned, a report submitted to the Ministry of Higher Education Malaysia strongly recommends global collaboration and providing data access to enhance innovations.[497] Since university researchers in Malaysia are encouraged to participate in global collaboration, enabling open access to and re-use of publicly funded research data in Malaysian public universities can facilitate their participation in international research collaborations. The Salvador Declaration on Open Access promotes the integration of scientific information from developing countries in the worldwide body of knowledge and urges the governments of developing countries (such as Malaysia) to make open access to publicly funded research a high priority in their science policies.[498] In terms of Malaysia's contribution to the worldwide body of knowledge, an UNCTAD report reveals that Malaysia contributes only 0.08% of the total flow of scientific papers in the past 22 years since 2007.[499] To increase the scientific flow, the report has made a recommendation for the Malaysian government to reconsider the existing policy of limiting public access to data generated by government institutions in particular from the universities.[500]

The threat against universities' academic mission is also eminent in Malaysia as the Malaysian Government has introduced an intellectual property commercialisation policy based on the US Bayh-Dole Act.[501] Like the US Bayh-Dole Act, the policy requires publicly funded intellectual property to be protected for the purpose of commercial exploitation.[502] In line with the above policy, the Ministry of Higher Education has set its target to commercialise at least five (5) percent of the research

497 Anonymous, above n 320, 167, 182.

498 'Salvador Declaration on Open Access: The Developing World Perspective' (2005) *Latin American and Caribbean Center on Health Sciences Information/Pan American Health Organization/World Health Organization*, <http://www.icml9.org/meetings/openaccess/public/documents/declaration.htm> (at 26 February 2010).

499 Anonymous, above n 320, 13.

500 Ibid, 167, 182.

501 The policy is known as "Intellectual Property Commercialisation Policy for Research & Development (R&D) Projects Funded by the Government of Malaysia 2009".

502 Intellectual Property Commercialisation Policy for Research & Development (R&D) Projects Funded by the Government of Malaysia 2009, Exploitation of Intellectual Property [8].

and development efforts of Malaysian public universities.[503] Incentives in the form of monetary reward will also be given to the researchers who manage to secure intellectual property protection for their inventions.[504] In addition, the researchers who successfully commercialise publicly funded intellectual property, shall be entitled to profit sharing.[505]

With the introduction of a Bayh-Dole like policy in Malaysia, commercialisation of the university's research output becomes the responsibility of Malaysian public universities. Among university researchers, the inclination to reap an incentive and or entitlement to profit sharing, might deviate their focus from the academic mission to a commercial motive in conducting publicly funded research. Enabling open access to and re-use of publicly funded research data in Malaysian public universities can help to ensure the academic mission of Malaysian public universities based on open and wide dissemination of knowledge and information is preserved.

As for the threat against the norms of open science arising from data withholding, no research has been conducted to explore the issue in Malaysia. Hence, there is no conclusive evidence whether this kind of practice exists. However, it is naïve to reject the possibility that the researchers in Malaysian public universities did not practice data withholding solely for lack of evidence. As a matter of prudence, it is safer to assume that data withholding practices among university researchers do occur in Malaysian public universities. Enabling open access to and re-use of publicly funded research data in Malaysian public universities is a practical step to prevent data withholding among university researchers as well as to prevent the erosion of the norms of open science in Malaysian public universities.

In a nutshell, the internal benefits to be enjoyed by the Malaysian public universities and their researchers either as data providers or data users, should make it desirable for the Malaysian public universities to enable open access to and re-use of publicly funded research data created by the university's researchers.

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503 Ministry of Higher Education Malaysia, above n 111, 32.

504 Intellectual Property Commercialisation Policy for Research & Development (R&D) Projects Funded by the Government of Malaysia 2009, Incentives for Invention, [12].

505 Ibid [11] Wealth Sharing Guidelines.

CHAPTER 4
LEGAL IMPEDIMENTS TO OPEN ACCESS AND RE-USE

4.1 OVERVIEW

Chapter 2 and Chapter 3 investigate the external and the internal benefits of enabling open access to and re-use of publicly funded research data. While enabling open access to and re-use of publicly funded research data is beneficial to society at large and universities, there are various impediments to the objective of enabling open access to and re-use of publicly funded research data. Although enabling open access to and re-use of publicly funded research data is technically feasible with the internet and ICT, there are social, ethical and legal issues which remain problematic.[506]

Arzberger et al have listed legal and policy issues as among five broad group issues that stand out in the examination of access and sharing regimes of public research data. Besides legal and policy issues, other broad group issues identified by them are technological issues, institutional and managerial issues, financial and budgetary issues and cultural and behavioural issues. They observe that the intellectual property laws, information policies, institutional guidelines and contracts at the national and international levels often impede data access and sharing practices.[507] According to the authors, data access and sharing practices were often adopted without due consideration of their legal impact.[508]

Uhlir and Schroder also admit that while there are many arguments favouring openness of publicly funded research, there are various statutory exemptions to free and unrestricted public access and use based on the need to protect national security, personal privacy, confidential information and proprietary rights in information.[509] Daniel Schaffer of the Academy of Sciences for the Developing World (TWAS) observes that there are a lot of challenges against free and open access to data

506 Ann-Sofie Axelsson and Ralph Schroeder, 'Making it Open and Keeping it Safe: E-enabled Data Sharing in Sweden and Related Issues' (Paper presented at the e-Social Science 2007, Ann Arbor, Michigan, October 7 - 9 2007).

507 Arzberger et al, above n 270, 146.

508 Ibid 136.

509 Uhlir and Schroder, above n 125, 206.

including regulatory and policy issues concerning intellectual property rights, privacy and security concerns.[510] The same observation is made by Weiner and Embi who identify personal privacy, intellectual property and data quality concerns as among the challenges in enabling access to and re-use of clinical data in centralised repositories.[511]

Several published reports have also identified the existence of legal impediments to access to and re-use of research data. A report published in 2011 by the McKinsey Global Institute has listed compliance with privacy and security laws and legal issues relating to intellectual property for data and liability as among the paramount issues which need to be addressed in a data policy.[512] The report further explains that among the legal issues concerning intellectual property rights attached to data which have to be answered are: who owns a piece of data?, what rights come attached with a dataset?, and what defines fair use of data?.[513]

The presence of legal impediments to open access to and re-use is also highlighted in the 2010 Ministerial Report on the OECD Innovation Strategy. It is reported that while access to and re-use of public sector information and content is generally becoming more open, obstacles sometimes impede efficient and effective use of publicly funded data and information.[514] The OECD Ministers in their support for open access to and re-use of publicly funded research data also acknowledge that disclosure of research data from public funding may be constrained by domestic law on national security, the protection of privacy of citizens and the protection of intellectual property rights and trade secrets that may require additional safeguards.[515]

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510 Daniel Schaffer, 'Free Data has Great Value, But Challenges Remain' (2011), <http://www.scidev.net/en/features/free-data-has-great-value-but-challenges-remain-.html> (at 28 June 2011).

511 Mark G Weiner and Peter J Embi, 'Toward Reuse of Clinical Data for Research and Quality Improvement: The End of the Beginning?' (2009) 151(5) *Annals of Internal Medicine* 359.

512 James Manyika et al, 'Big Data: The Next Frontier for Innovation, Competition, and Productivity' (McKinsey Global Institute, 2011) 11, 116.

513 Ibid 120.

514 Anonymous, above n 252, 17.

515 Anonymous, above n 80.

The CODATA Berlin Conference Discussion Paper acknowledges that access to and re-use of certain data from public funding will be limited by legal restrictions such as national security, privacy and trade secrets.[516] CODATA recommends that where copyright or database law applies, the publicly funded parties responsible for agreements and contracts concerning access to research data should take the relevant implications of the existing legal framework into account to allow for open access.[517] UNESCO, in giving their support for open access, cautioned that sharing of research data is subject to applicable national security controls and the rights of others deriving from obligations of confidentiality, intellectual property and privacy protection.[518] The Centre for Spatial Law and Policy white paper on legal and policy issues associated with geospatial data also acknowledges that laws and policies with respect to issues such as privacy, data quality, intellectual property rights and national security remain confusing, inconsistent or unclear.[519]

It is clear that the objective of enabling open access to and re-use of publicly funded research data is not straight forward as there are a myriad of legal and non-legal impediments to the objective. Despite the existence of various legal and non-legal impediments which become barriers to open access and re-use, this thesis focuses on the legal impediments to the objective of enabling open access to and re-use of publicly funded research data.[520] The research question which need to be answered in this chapter is: What are the legal impediments to the objective of enabling open access to and re-use of publicly funded research data?

The purpose of identifying the legal impediments is to find out in what way the law impedes the objective of enabling open access to and re-use of publicly funded research data. Legal impediment arises when the existence or absence of legal rights and duties have the effect of restricting, obstructing, hindering or slowing down the objective of enabling open access to and re-use of publicly funded research data.

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516 Schroder, above n 77, 13.

517 Ibid 14.

518 Raivo Ruusalep, 'A Comparative Study of International Approaches to Enabling the Sharing of Research Data' (JISC, 2008) .

519 Anonymous, 'Legal and Policy Issues Associated with Geospatial Data and Technology' (The Centre for Spatial Law and Policy, 2011).

520 According to Peter Suber, there are four kinds of access barrier: i) filtering and censorship barriers; ii) language barriers; iii) handicap access barriers; and iv) connectivity barriers. See Suber, above n 1, 26.

4.2 THE LEGAL IMPEDIMENTS

4.2.1 Intellectual Property Protection of Research Data

The rapid expansion of intellectual property law in recent decades has seen the inclusion of new types of intellectual creation which are protected as proprietary rights. Among the most significant is the inclusion of data sets and databases as intellectual property.[521] While the intellectual property law of most countries does not protect disparate data,[522] research data may be subject to copyright protection if it meets the proprietary requirement for such protection which, depending on the legal jurisdiction, may be based on the originality or the so-called 'sweat of the brow' doctrine.[523] Therefore, a broad category of research data which exists in digital format and which is original in terms of expression, selection, arrangement or compilation is subject to copyright protection.[524]

Apart from copyright protection, the intellectual property protection in research data in some countries such as the European Union member countries also includes *sui generis* protection for databases and data sets known as database rights.[525] The *sui generis* database rights depart from the long established principles of intellectual property law by removing the distinction between protection of expression and protection of ideas.[526] With *sui generis* database rights, the data compiler can assert intellectual property protection and demand payment for licensing the use of data content, including the content which is already in the public domain, that could not be otherwise copyright-protected. [527]

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521 PK Yong, 'Database Protection: The International Debate: Balancing Users Rights and the Protection of Database' (2007) 6 *Malayan Law Journal Articles* 27; 'Copyright and Images' *Staffordshire University*, <https://www.staffs.ac.uk/legal/copyright/Images/index.jsp> (at 1 June 2010).

522 JH Reichman and Pamela Samuelson, 'Intellectual Property Rights in Data?' (1997) 50 *Vanderbilt Law Review* 72.

523 Gideon Emcee Christian, 'Building a Sustainable Framework for Open Access to Research Data Through Information and Communication Technologies' (International Development Research Centre Canada, 2009) 18.

524 Andrew Charlesworth, 'IPR and Research Data' (2011) *Intellectual Property Rights and Research in the Digital Age*, <http://www.lib.cam.ac.uk/dataman/pages/IPR.html> (at 28 June 2011).

525 Trosow, above n 343, 18.

526 Keith E Maskus, 'Intellectual Property Rights and Economic Development' (2000) 32(3) *Case Western Reserve Journal of International Law* 492.

527 Ibid.

The expansion of intellectual property rights in data has raised concern about its implications on the future of open science.[528] A fundamental concern about the expansion of intellectual property rights in data is that it could impoverish the public domain and diminish access to and re-use of technological data and information including those in the research institutions.[529] The Committee on Data for Science and Technology (CODATA), an interdisciplinary Committee of ICSU express their concern about a new form of intellectual property protection for the contents of databases, which would fall outside traditional copyright regimes.[530] The ICSU in its report on "Data and Information Access and Dissemination for Scientific Research" points out that recent trends towards the protection of databases under *sui generis* regimes pose serious obstacles to full and open access to research data. [531]

As far as open access to and re-use of research data is concerned, intellectual property rights have been conferred on the owners to prevent other people from using the research data without their permission.[532] In the presence of intellectual property protection, the public will find it more difficult to access and re-use the research data as permission from the data owner is required even for very small excerpts of research data protected by it.[533] The data owner whose permission is sought, is under no obligation to give permission unless they are compelled to do so under the law or contract.[534] Hence, intellectual property protection of research data in most cases serves to restrict rather than enhance the rights to access and re-use of the research data.[535]

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528 See Charlotte Hess and Elinor Ostrom, 'Ideas, Artifacts, and Facilities: Information as a Common-Pool Resource' (2003) 66 *Law and Contemporary Problems* 111; Jerome M Clubb et al, 'Sharing Research Data in the Social Sciences' in Stephen E Fienberg, Margaret E Martin and Miron L Straf (eds), *Sharing Research Data* (National Academy Press, Washington DC, 1985) 60; Armbruster, above n 129, 15.

529 Jerome H Reichman and Tracy Lewis, 'Using Liability Rules to Stimulate Local Innovation in Developing Countries: Application to Traditional Knowledge' in Keith Eugene Maskus and Jerome H Reichman (eds), *International Public Goods and Transfer of Technology Under a Globalized Intellectual Property Regime* (Cambridge University Press, 2005) 340; Royal Society Working Group on Intellectual Property, above n 459, v.

530 ICSU/CODATA Ad Hoc Group on Data and Information, above n 17.

531 Committee on Scientific Planning and Review, above n 29.

532 Paul A David, 'Can 'Open Science' be Protected from the Evolving Regime of IPR Protections?' (2004) 129(March) *Journal of Institutional and Theoretical Economics* 1.

533 Maskus, above n 526, 492; Anne Fitzgerald, 'Sharing Environmental Data: The Role of an Information Policy and Copyright Licensing' (2009), <http://www.eresearch.edu.au/docs/2009/era09_submission_122.pdf> (at 20 June 2011).

534 Brian Fitzgerald, 'Open Content Licensing (OCL) for Open Educational Resources' (OECD, 2007).

535 Christian, above n 523, 4.

A report on 'Building a Sustainable Framework for Open Access to Research Data Through Information and Communication Technologies' prepared for the Canadian International Development Research Centre (CIDRC), states that where research data is protected by copyright law, it is not a proper subject for open access.[536] Another report on dealing with data prepared for the United Kingdom Office for Library and Information Networking (UKOLN) states that the legal impediment arising from intellectual property rights in data acts as a barrier to making data sets publicly available.[537]

Among scholars, there is argument that the expansion of intellectual property regimes is more likely to generate excessive protection that outweighs the likely social benefits.[538] It is argued that current intellectual property rights that promote extensive proprietary claim in research data is not in the interests of public and science.[539] Salokannel argues that the more ideas, facts and information are protected either as database or intellectual creations, the more access to the stock of knowledge is restricted.[540]

Paul David argues that the expansion of intellectual property regimes has encroached upon the culture of academic research and challenging the ethos of collaborative science.[541] David further argues that the expansion of intellectual property rights in research data increases the density of "royalty stacking" in the licenses imposed collectively by owners of copyright and database rights.[542] According to David, when intellectual property owners exploit their rights in search of greater profits, the effect almost invariably raises the costs that other parties are obliged to incur in order to access and utilise the data.[543]

The expansion of intellectual property rights in research data increases access charges and transaction costs which adversely affect the conduct of science,

536 Ibid 19.
537 Liz Lyon, 'Dealing with Data: Roles, Rights, Responsibilities and Relationships: Consultancy Report' (UKOLN, 2007).
538 Reichman and Lewis, above n 529, 340.
539 Schroeder, above n 333, 3.
540 Salokannel, above n 232, 5.
541 David, above n 532, 3.
542 Ibid.
543 Ibid 1.

especially exploratory research programs conducted in universities.[544] There is fear that the researchers may be constrained by what data they are easily allowed to access and re-use, rather than what is best from a scientific point of view.[545] As far as public access is concerned, Pappalardo and Fitzgerald cite several earlier arguments that point out that by treating knowledge, information and research as a commodity and by charging high subscription prices to access that commodity, it has the consequence of limiting the public benefit of research by limiting the number of people who can afford to access and re-use it.[546]

The intellectual property protection of research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.2 Ambiguity About Ownership of Research Data

It is reported that, ambiguity about ownership of research data has a negative implication on self-archiving practices among university researchers. Kim Ji-Hyun's study on the factors which make university researchers reluctant to self-archive their research output finds that ambiguity about ownership of research output hinders their participation in self-archiving practices.[547] Kim's study also cites several earlier studies with similar findings, suggesting that ambiguity about ownership of research outputs hinders self-archiving in open access repositories.[548] Margaret Henty, who conducts her research in Australian universities, finds that among the major issues highlighted by university researchers as obstacles in archiving their research output in open access repositories, are the legal issues arising from ambiguity about intellectual property ownership.[549] While Kim's and Henty's studies are about ownership of research output in general without specifying research data, Lievesley

544 David, above n 532, 1.

545 PA Andanda, 'Human-Tissue-Related Inventions: Ownership and Intellectual Property Rights in International Collaborative Research in Developing Countries' (2006) 34 *Journal of Medical Ethics* 171.

546 Pappalardo et al, above n 363.

547 Kim Ji-Hyun, *Faculty Self-Archiving Behavior: Factors Affecting the Decision to Self-Archive* (PhD Dissertation Thesis, The University of Michigan, 2008) 54, 213.

548 Ibid.

549 Margaret Henty, 'Ten Major Issues in Providing a Repository Service in Australian Universities' (2007) 13(5/6) *D-Lib Magazine* 7.

specifically identifies ambiguity about data ownership as among the barriers to data sharing.[550]

While data ownership has until recently never been much of an issue, enabling open access to and re-use of publicly funded research data has raised the need to determine who is the rightful data owner.[551] The need arises as the data owner's consent is required before research data could be released in an open access data repository.[552] There are two legal regimes which govern ownership of research data. First, the intellectual property rights (IPR) legal regime, where as a general rule, the owner of a work for purposes of copyright law is the person who creates the work by translating the idea into a fixed, tangible expression. Second, the law of contract, may transfer or assign ownership of research data through various contractual relationships.[553] The most common contractual relationships involving university researchers are the research funding agreements with public research funding agencies and the employment agreement with the university.[554]

Where the intellectual property is created by university researchers in the course of employment, the intellectual property laws in most countries vest rights of ownership in their employer unless there is a written agreement specifically providing otherwise.[555] The principle that ownership of intellectual property created in the course of employment resides in the employing institution rather than the employee is a natural consequence of the contractual relationship between employer and employee, which is developed under a "work-for-hire" doctrine.[556] In light of the application of the "work-for-hire" doctrine, it is necessary to determine whether the

550 Lievesley, above n 128. See also, Peifer, above n 93, 51.

551 Christian, above n 523, 8.

552 Barbara J Culliton, 'Authorship, Data Ownership Examined' (1988) 242 *Science* 658; Estelle A Fishbein, 'Ownership of Research Data' (1991) 66(3) *Academic Medicine* 129.

553 Chris Hinds et al, 'Ownership of Intellectual Property Rights in Medical Data in Collaborative Computing Environments' (Paper presented at the International Conference on e-Social Science 2005, Manchester Conference Centre, 22– 24 June 2005).

554 Monotti and Ricketson, above n 162, 97.

555 David Nimmer, Peter S Menell and Diane McGimsey, 'Pre-Existing Confusion in Copyright's Work-for-Hire Doctrine' (2002) *UC Berkeley Public Law Research Paper No. 109; UCLA School of Law Research Paper No. 02-33*, <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=359720> (at 27 June 2011).

556 Cynthia Cleves, 'Work-for-Hire Doctrine and the Graham Decision' (2004) (November/December 2004) *The Licensing Journal* 29; Melissa A Finocchio, 'Copyright Ownership and the Works Made for Hire Doctrine: The Supreme Court Adopts the Literal Interpretation' (1990) 6 *Santa Clara Computer & High Technology Law Journal* 126.

research data was produced in or outside the course of a university researcher's employment.[557]

Where the research data is created by a university employee in the course of employment and in a situation where the research is publicly funded, question arises whether ownership of the research data remains with university as the employer of the researcher or is vested in the public research funding agencies.[558] Similarly, ownership of publicly funded research data is also ambiguous when it was created by a university employee outside the course of employment, as it is unknown whether ownership resides in the employing university or the public research funding agencies.[559]

Besides university researchers who are employees of universities, there are also non-employee researchers of universities such as university visitors, associates, adjuncts, post-doctoral fellows, trainees of the academic staff training scheme and students of the university.[560] Compared to a university researcher who is an employed university researcher, these non-employee university researchers may have different contractual arrangements with the university in term of ownership of research data.[561] Where the research is publicly funded, it adds another layer of contractual relationship between non-employee university researchers and public research funding agencies. Due to a web of contractual relationships which have been entered into by a non-employee university researcher, there are many parties who could potentially become the owner of publicly funded research data.[562]

Ambiguity about ownership also exists in research data that was created by more than one researcher under research collaboration agreements. Such collaborations

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557 Fishbein, above n 552, 129; Sandler Chanani, 'Copyright Ownership: A Fundamental of "Academic Freedom"' (2001) 12 *Albany Law Journal of Science & Technology* 239.

558 In a report submitted to the Australian Law Reform Commissions it is stated that as a general rule, governments and their public funding agencies do not claim intellectual property rights over the results of the research they fund. See David Weisbrot, Brian Opeskin and Anne Finlay, 'Genes and Ingenuity Report: Gene Patenting and Human Health' (Australian Law Reform Commission, 2004) 264.

559 Nimmer, Menell and McGimsey, above n 555, *109*.

560 Louise Monotti and Ricketson, above n 162, 104-121.

561 Weisbrot, Opeskin and Finlay, above n 558, 270.

562 Fitzgerald et al, above n 133, 285-286.

raise issues around intellectual property ownership.[563] Collaborative production which replaces individual effort poses an array of new and challenging legal issues on ownership of research output. Collaborating parties may be unclear of who has ownership rights over the research outputs and who can make legally binding decisions regarding publication or dissemination of the research output.[564]

In determining the right of ownership to work carried out by more than one researcher, there are a number of factors that must be considered: i) the type of work: is the work of a singular nature such as a literary work or does it comprise a blend, for example cinematographic work or musical work? ii) whether the work is made up of indistinguishable or of distinguishable contributions, where each contribution can be identified as coming from a particular author; iii) whether the contributions are dependent or independent, work can be distinguishable but dependent or distinguishable but independent, i.e. the work is independently copyrightable; and iv) the intention of the joint authors at the time of the creation of a joint work, which can be decisive to the allocation of ownership right.[565]

Where publicly funded research data is created under research collaboration between a university researcher with a non-university researcher from another research institution, data ownership becomes even more ambiguous.[566] Collaboration with a non-university researcher may involve a number of organisations, funding bodies, government agencies and commercial entities in a variety of combinations.[567] The laws or the policies of the collaborating parties might be different or even conflicting to one another in terms of the right to ownership of publicly funded research data created under research collaboration.[568] As argued by Kim Ji-Hyun, Margaret Henty and Denise Lievesley, ambiguity about ownership of publicly funded research data

563 Weisbrot, Opeskin and Finlay, above n 558, 271.

564 See Rochelle Cooper Dreyfuss, 'Collaborative Research: Conflicts on Authorship. Ownership and Accountability' (2000) 53 *Vanderbilt Law Review* 1159; Anonymous, 'Whose Data Is It', <http://www.bc.edu/research/rcadmin/topics/data/open.shtml> (at 12 May 2010).

565 See Mark Perry and Thomas Margoni, 'Ownership in Complex Authorship: A Comparative Study of Joint Works' (2012) 34(1) *European Intellectual Property Review* 22.

566 Monotti and Ricketson, above n 162, 123.

567 Weisbrot, Opeskin and Finlay, above n 558, 271.

568 Ibid 272.

created in collaborative research prevents any member of collaborative research projects from depositing their research data in open access repository.[569]

Ambiguity about ownership of research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.3 Data Owner's Exclusive Rights in Research Data

While the distinction between "Intellectual Property Protection of Research Data" and "Data Owner's Exclusive Rights in Research Data" is a very narrow one, this thesis treats them separately. As discussed earlier, access to and re-use of the research data protected by intellectual property rights is restricted and subject to permission from data owner. Therefore, this section proceeds to discuss how a data owner who has an exclusive rights in research data may exercise the rights by controlling, refusing or restricting data access and re-use.

For the purpose of this thesis, a data owner is an individual or entity that has legal ownership rights of research data and can authorise or deny access to the research data even if the research data was created by another party.[570] A data owner might want to exercise a certain level of control over access to and re-use of the research data. The data owner might want to control how the research data is used, copied and shared and under what conditions.[571] A data owner might also want to control the time and method of dissemination, its preservation or destruction. They might also want to control the right to access and re-use the research data.[572] A data owner's desirability to control access to and re-use of their research data is recognised by the

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569 See Ji-Hyun, above n 547, 213; Henty, above n 549, 7; Lievesley, above n 128. See also, Peifer, above n 93, 51.

570 See 'Data Owner' (2011) *IT Law Wiki*, <http://itlaw.wikia.com/wiki/Data_owner> (at 27 June 2011); 'Data Owner' (2010) *Free Computer Dictionary*, <http://www.freecomputerdictionary.com/terms/63128-data-owner.html> (at 27 June 2011).

571 Fitzgerald, Pappalardo and Austin, above n 135, 173.

572 See Fishbein, above n 552, 129; David Loshin, 'Who Owns Data' (2003) (March) *Information Management Magazine*, <http://www.information-management.com/issues/20030301/6389-1.html> (at 26 April 2010).

intellectual property law in most countries which empowers a copyright owner with the exclusive right to control access to and re-use of their works.[573]

Where the research data is protected as copyright work, a data owner has the exclusive right to control the reproduction, distribution, or communication of their work to the public.[574] A data owner also has the exclusive right to publish, distribute and reproduce their works in public, either for free or by charging money from those who access or re-use their research data.[575] Another exclusive right of a data owner is the right to prepare and authorise the preparation of derivative works based upon the copyright work owned by them.[576]

In the presence of these exclusive rights, a data owner has the right to control what type of use is allowed and by whom, what data can be published or disclosed, what data can be combined and how and what data can be re-used and for what purpose.[577] In exercising their exclusive rights in research data, the data owners are entitled to control access to and re-use of research data against the rest of the world.

Contrary to a data owner's desire, enabling open access and re-use requires a data owner to license the general public with the rights that copyright law grants exclusively to them. Hence, there is fear among the data owners that they will lose control over access to and re-use of the research data whenever they release the research data as open access materials.[578] This loss of control occurs when a data owner cannot monitor the usage of the research data or when the owner cannot prevent the research data from being used for purposes that differ significantly from

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573 Tor Sveum, 'Open Access versus Copyright: Legal Issues and the Norwegian Ask the Library Service' (Paper presented at the 16th BOBCATSSS Symposium 2008 - Providing Access to Information for Everyone Zadar, Croatia, 28 - 30 January 2008) 235.

574 See Fishbein, above n 552, 129; Peter Suber, 'Information Platform Open Access: Copyright' (2010), <http://open-access.net/de_en/general_information/legal_issues/copyright/> 2 August 2010).

575 Nicole Ebber, 'Creative Commons Licenses: New Ways of Granting and Utilising Access to Information' (Paper presented at the 16th BOBCATSSS Symposium 2008 – Providing Access to Information for Everyone Zadar, Croatia, 28 - 30 January 2008).

576 Chanani, above n 557, 259.

577 Thinh Nguyen, 'Freedom to Research: Keeping Scientific Data Open, Accessible and Interoperable' (2008) 1, <http://sciencecommons.org/wp-content/uploads/freedom-to-research.pdf> (at 17 October 2010).

578 Terry Elizabeth Hendrick, 'Justifications for and Obstacles to Data Sharing' in Stephen E Fienberg, Margaret E Martin and Miron L Straf (eds), *Sharing Research Data* (National Academy Press, Washington DC, 1985) 136.

the original purpose of the research.[579] In "Justifications for and Obstacles to Data Sharing" Hendrick has identified loss of control of research data as among the major concerns in sharing research data.[580] Hendrick's later work again found that the general reservations expressed by the researchers about data sharing includes anxiety about losing control in the research data created or originated by them.[581]

Fear of loss of control over research data has prompted data owners to exercise their exclusive rights to research data by refusing to share the research data with secondary users.[582] Access to and re-use of research data including those which are not protected as copyrights are increasingly being encrypted electronically. Recent development in copyright law that introduced the anti-circumvention provision adds another layer of exclusive rights to control access to and re-use of the research data.[583] The anti-circumvention provision, when applied to research data, vests in a data owner one of the strongest digital safeguards against any form of access or use.[584]

A data owner's exclusive rights in research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.4 The Restrictive Scope of the Legitimate Use of Research Data

The restrictive rules governing the legitimate use of research data has also been identified as another legal impediment to the objective of enabling open access to and re-use of research data.[585] The restriction exists as most libraries and academic institutions draw heavily on copyright as the main perimeter on which access to and re-use of data and information is facilitated.[586] The UK Joint Information Systems

579 Ibid.
580 Hendrick, above n 578, 136.
581 Hendrick, above n 271, 168.
582 Joan E Sieber, 'Social Scientists Concerns About Sharing Data' in Joan E Sieber (ed), *Sharing Social Science Data: Advantages and Challenges* (Sage Publications, Newbury Park, California, 1991) 143.
583 Salokannel, above n 232, 10.
584 Yong, above n 521, 36.
585 Anonymous, above n 252, 17.
586 Ida Madieha Abdul Ghani Azmi 'Institutional Repositories in Malaysia: The Copyright Issues' (2009) 17(3) *International Journal of Law and Information Technology* 273.

Committee's (JISC) study on international approaches to sharing of research data found that some open access advocates to research data take a narrow view of open access. The narrow approach to open access is merely concerned with removing barriers to make data freely accessible, but with no right to re-use beyond the fair dealing/fair use exception, calling it often as 'data publishing'.[587]

The restrictive and narrow scope of the legitimate use of research data is inconsistent with the aim of open access, to provide universal access to knowledge and information with minimal restrictions on their use.[588] Kenneth D Crews commenting on copyright restrictions to public access and use, notes that most universities are overly conservative in their interpretation of copyright, often to the neglect of their own interests.[589] Crews observes that even though 'fair use' or 'fair dealing' is allowed under the copyright regime, the statutes and court rulings seldom define the scope of these privileges. Neither does the university's intellectual property policy do so, leaving the users in a state of uncertainty whether their usage is within the permitted acts or at risk of civil and criminal penalties.[590] Thomas Cotter observes that in recent years the uncertainty over the permitted use of a copyrighted work has become a dominant consideration as to whether the use is fair or unfair in the US.[591]

The legal impediment arising from the restrictive scope of the legitimate use is evidenced by a series of legal actions concerning fair use brought by journal publishers against Georgia State University (GSU). The publishers have sued GSU over online sharing of academic articles and excerpts from academic books. The publishers claim that there are massive copyright infringements occurring in GSU's electronic reserves service as well as in online courses hosted by GSU. The publishers demand permission fees for copyright materials used in excess of fair use.

587 Ruusalep, above n 518, 9.

588 See Das, above n 295; Adrian K Ho and Charles W Bailey, 'Open Access Webliography' (2005) 33(3) *Reference Services Review* 346; 'Civil Society Declaration to the World Summit on the Information Society', above n 305.

589 Kenneth D Crews, 'Copyright, Fair Use, and the Challenge for Universities: Promoting the Progress of Higher Education' in Abdul Ghani Azmi, above n 586, 273.

590 Ibid.

591 Thomas F Cotter, 'Transformative Use and Cognizable Harm' (2010) 12(4) *Vanderbilt Journal of Entertainment and Technology Law* 701.

The publishers' list of claims as exceeding fair use range from 9.9% to 26.4% of works being posted without permission.[592]

The restrictive scope of the legitimate use of copyright protected works prevents data users from utilising research data deposited in an open access repository. The situation is getting even worse as many users are in a state of uncertainty as to what use of a work is permitted and what is prohibited.[593] According to Suber, the boundary between what is allowed and disallowed under fair use is vague, fuzzy and contestable.[594] For reasons of caution, uncertainty and fear of legal implications, fair use or fair dealing exceptions are not fully utilised by members of the public. Rather than risking copyright infringement, the public choose not to use any of the deposited works at all.[595]

A survey conducted in the year 2009 by Carlhed and Alfredsson on practices of open access to and re-use of research data in Sweden finds that the respondents in general expressed a great uncertainty about questions of amounts of reusable digital data accessed by them.[596] A report on licensing strategy for sharing and re-use of geospatial data in the academic sector prepared by Waelde and McGinley for JISC also found that the parameters of fair dealing under the law of copyright are so uncertain that they have become the subject of much anxious debate. The report further states that, in the absence of any court judgment on this matter, the state of the law is unknown and the parameters of fair dealing will be for negotiation between the respective parties.[597]

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592 See Peggy Hoon, 'The Georgia State University Lawsuit Injunction: Back to the Future' (2011) *Centre for Intellectual Property, University of Maryland University College*, <http://www-apps.umuc.edu/blog/collectanea/2011/06/the-georgia-state-university-l.html> (at 2 July 2011); Nancy Sims, 'Obscure(ish) Academic Fair Use Case Has Potential for Wide-Ranging Impact' (2011), <http://www.techdirt.com/articles/20110603/21344514552/obscureish-academic-fair-use-case-has-potential-wide-ranging-impact.shtml> (at 2 July 2011).

593 Ebber, above n 575.

594 Suber, above n 1, 65.

595 Ebber, above n 575.

596 Carlhed and Alfredsson, above n 61.

597 Charlotte Waelde and Mags McGinley, 'Designing a Licensing Strategy for Sharing and Re-Use of Geospatial Data in the Academic Sector' (JISC, 2007).

The restrictive scope of the legitimate use of research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.5 Complex and Lengthy Licensing Procedures for Research Data

For research data which is protected as intellectual property, permission to access and re-use the research data which exceeds the scope of the legitimate use provided under fair use/fair dealing exceptions, must be obtained by the prospective user from the data owner or copyright holder.[598] Permission for the users to access and re-use the research data may be secured by way of a license or assignment and in most cases subject to negotiated fee or royalty. More commonly, such rights are secured by way of a license as opposed to by way of an assignment. [599]

A report on copyright law prepared by the California State University indicates that the growth of licensing as a mechanism for the un-bundling of ownership rights within the university setting has established greater reliance on contractual terms for the rights to use copyright materials. [600] Various other reports also indicate that fragmented property rights in research data coming from multiple sources of ownership require a substantial negotiation effort in order to access and re-use the research data. If data users were to enter into a licensing or assignment contract each time they want to access and re-use the research data, the progress of open access will be retarded and transaction costs for data access will be high. As there is a likelihood that a data owner will refuse to license the research data, the need to secure a license prior to each use of research data becomes an impediment to open access and re-use.[601]

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598 Suber, above n 1, 65.

599 Linda Wang, 'Use of Images for Commercial Purposes: Copyright Issues Under Malaysian Laws' in Barbara Hoffman (ed), *Exploiting Images and Image Collections in the New Media: Gold Mine or Legal Minefield?* (Kluwer Law International, London, UK, 1999) 86.

600 Academic Senate of the California State University, 'Intellectual Property, Fair Use, and the Unbundling of Ownership Rights' (California State University, 2003) 18.

601 See Richard A Spinello, 'Property Rights in Genetic Information' (2004) 6(1) *Ethics and Information Technology* 35; Anonymous, above n 252, 17; Stephanie Woods, 'Creative Commons - A Useful Development in the New Zealand Copyright Sphere?' (2008) 14 *Canterbury Law Review* 38; Christian, above n 523, 22.

Even when the permission to access and re-use the research data is granted, the copyright licensing mechanism is costly and time consuming and not well suited to being used in the digital environment. Since copyright licenses usually cover a specific situation, when someone else wishes to use the copyright work in question or the original licensee wishes to change the way in which they use the copyright work, a new license contract must be negotiated.[602] Where the reproduction of the works must be obtained from numerous sources and involve different copyright owners, it may be excessively difficult and cumbersome to obtain all the licenses within a short period of time.[603]

In granting the permission to access and re-use, the data owners have a wide range of licensing conditions to choose from.[604] Their choice ranges from the broadest possible license to the narrowest form of licensing. Permission from a data owner will vary from one licensing contract to another, which depends largely on the attitude and bargaining strength of the negotiating parties.[605] Therefore, the rights to access and re-use the research data is subject to diverse licensing arrangements.[606] A wide range of licensing options complicate any attempts to enable open access to and re-use of the research data. Data users who want to use data from many databases, need to deal with a myriad of differing and overlapping licensing procedures which carry conflicting obligations, limitations and restrictions.[607]

Complex and lengthy licensing procedures has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.6 Author's Moral Right of Integrity

Margaret Wilkinson in her discussion on open access in Canada and in the US states that one problem the open access movement has encountered is that in most countries

602 Woods, above n 601, 38.
603 Wang, above n 599, 86.
604 Although the word "copyright" is singular, it covers a plurality of rights and copyright holders may waive some and retain others. See Suber, above n 1, 68.
605 Academic Senate of the California State University, above n 600, 18.
606 Wang, above n 599, 86.
607 Nguyen, above n 577.

there is a second set of rights involved in the copyright environment, which is moral rights. [608] According to Wikinson, in some cases, the author of a work, who is the holder of the moral rights, can frustrate the exercise of validly held economic rights in a work.[609]

Moral rights are the rights of the creators to disclose their works to the public in whatever form the creator chooses, to withhold the creation from the public and to demand respect for his or her work.[610] Moral rights are meant to protect the rights of the author who creates the work as opposed to those who fund or commission the creation of that work, especially in countries that recognise the work for hire doctrine.[611] The period of moral rights protection varies from one country to another. The protection could be perpetual or is as same as the period of protection for the economic rights. While moral rights are inalienable or cannot be assigned, waiver of moral rights is permitted in some countries.[612]

Article 6*bis* of the Berne Convention for the Protection of Literary and Artistic Works recognises the moral rights of the author as independent of their economic rights. Moral rights are not transferable even if the ownership of copyright changed hands. Two most widely recognised moral rights are the right of attribution, ensuring the author is acknowledged as the creator of his own work and the right of integrity, which allows an author to object mistreatment or abuse of his work.[613] The right of integrity are "personal" interests that are fundamentally different from the "economic" or "commercial" interests that are protected by the copyright.[614]

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608 Margaret Ann Wilkinson, 'Access to Digital Information: Gift or Right?' in Mark Perry and Brian Fitzgerald (eds), *Knowledge Policy for the 21st Century: A Legal Perspective* (Irwin Law, Toronto, 2011) 336.

609 Ibid.

610 Peter E Berlowe, Laura J Berlowe-Heinish and Peter A Koziol, 'In this Digital Age, are We Protecting Tomorrow's "Masterpieces"? Protection of the Moral Rights of the Digital Graphic Artist' (2007) 81(9) *Florida Law Journal* 30.

611 Cyrill P Rigamonti, 'Deconstructing Moral Rights' (2006) 47(2) *Harvard International Law Journal* 360.

612 Wilkinson, above n 608, 336.

613 See Mira T Sundara Rajan, 'Moral Rights and Copyright Harmonisation: Prospects for an International Moral Right?' (2002) *17th BILETA Annual Conference*, <http://www.bileta.ac.uk/02papers/sundarajan.html> (at 16 July 2010); Armbruster, above n 129, 17; Armstrong et al, above n 617.

614 Henry Hansmann and Marina Santilli, 'Authors' and Artists' Moral Rights: A Comparative Legal and Economic Analysis' (1997) 26(1) *Journal of Legal Studies* 102.

The Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities 2003 requires the authors and the rights holders of scientific data and information to grant to all users the rights to access and re-use, but at the same time preserves the author's moral rights.[615] Besides the Berlin Declaration, the Budapest Open Access Initiative 2002 also recognises author's moral rights of integrity and attribution.[616]

Armstrong et al observe that while the right of attribution is unlikely to have any negative effects on the right to access and re-use copyright material, the moral right of integrity (which prohibits third parties from doing any modification that tarnishes the integrity of the author of copyright works) could potentially inhibit access to and re-use of the research data.[617] Brian Fitzgerald, discussing open content licensing reminds us that moral rights issues need to be considered and the public need to be mindful of the moral rights obligations and how far these obligations need to be observed.[618]

Suber points out that researchers in academic institutions in particular are known to care most for their moral right, which respects their personal interests and personal relationship with their works.[619] A study conducted by Gadd et al confirms Suber's observation as their study concludes that most academicians are primarily interested in preserving their moral rights.[620] The researchers' personal attachment with their works may lead them to prohibit or to object to any modification or alteration to the research data which they claim as tarnishing their honour and reputation. In certain cases the researchers may wish to impose certain legal restrictions on the use of their research data. They may wish to be assured that the data will not be misinterpreted, that reference be made of the context in which the data were collected and that they

615 'Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities', above n 18.

616 'Budapest Open Access Initiative', above n 86.

617 Chris Armstrong et al, 'ACA2K: Comparative Review of Research Findings' (Shuttleworth Foundation and University of Witwatersrand, 2010).

618 Fitzgerald, above n 534, 14.

619 Suber, above n 574.

620 Elizabeth Gadd, Charles Oppenheim and Steve Probets, 'RoMEO Studies 2: How Academics Want to Protect their Open Access Research Papers' (2003) 29(5) *Journal of Information Science* 333.

will be consulted on the proposed usage/interpretation of the data prior to publication.[621]

Nicholas Suzor in his thesis on transformative use of copyright material identifies the author's moral right of integrity as one of the provisions in copyright law which impedes the ability of users to engage in transformative use of copyright expression.[622] In the presence of an author's moral right of integrity, the data users are required to obtain permission from the data creator or their personal representatives before they can significantly alter, modify or transform the research data. In the absence of such permission, the data users could be prohibited by the data creator from making any alteration, modification or transformation to the research data, regardless whether the act would negatively impact or objectively improve the work.[623]

Author's moral right of integrity has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.7 Non-Disclosure Duty of Confidential Research Data

A non-disclosure duty is an obligation to keep the confidential information within a particular relationship and not to share it with the third party.[624] Where a non-disclosure duty exists, prior permission to release research data containing confidential information is required.[625] The Economic and Social Research Council

621 Schroder, above n 77, 32.

622 According to Suzor, transformative use refers to the use of existing expression that, while still embodying elements of the original work, is original in its own right. It extends beyond the mere repackaging of the existing material, to the creation of some new expression. See Nicolas Suzor, *Transformative Use of Copyright Material* (Master Thesis, Queensland University of Technology, 2006).

623 Rigamonti, above n 611, 364.

624 See Michele M Easter, Arlene M Davis and Gail E Henderson, 'Confidentiality: More Than a Linkage File and a Locked Drawer' (2004) 26(2) *IRB: Ethics and Human Research* 14; Anonymous, 'Recommendations on Confidentiality and Research Data Protections' (National Human Research Protections Advisory Committee, 2002) 2; Stephen E Fienberg, 'Conflicts Between the Needs for Access to Statistical Information and Demands for Confidentiality' (1994) 10(2) *Journal of Official Statistics* 117; Ke Yu, 'Confidentiality Revisited ' (2008) 6 *Journal of Academic Ethics* 161.

625 Louise Corti, Annette Day and Gill Backhouse, 'Confidentiality and Informed Consent: Issues for Consideration in the Preservation of and Provision of Access to Qualitative Data Archives' (2000) 1(3) *Forum: Qualitative Social Research*, <http://www.qualitative-research.net/index.php/fqs/article/view/1024/2208> (at 20 July 2011).

(ESRC) Qualitative Data Archival Resource Centre's consultation with the research community and potential depositors of data in the UK, finds non-disclosure duty as the most frequent cause of concern in data archiving. Hendrick identifies the researchers' concerns over non-disclosure duty of confidential research data as among the main obstacles to data sharing.[626] The concern arises as shared or archived data may be disclosed at the expense of compromising confidentiality.[627] Lievesley as well as Kuula and Borg also report obstacles in data sharing caused by non-disclosure duty arising from the promise of confidentiality made by the researchers to their respondents.[628]

From legal perspectives, non-disclosure duty of confidential data implies an obligation that further disclosure to a third party will not be allowed to occur without permission or authorisation from the individual (or organisation) who disclosed the confidential information in the first place.[629] A non-disclosure duty may arise from legal contracts that control disclosure of confidential information such as trade secrets, confidential agreements or non-disclosure agreements.[630] These contracts require the researchers to keep the information secret by denying third party's access to the confidential information. In the presence of these contracts, the researcher will be under contractual duty not to disclose the research data which contains confidential information. Release of the research data which contains the confidential information is effectively barred unless the party to the contract can be re-contacted for permission.[631]

Besides non-disclosure duty arising from contracts, it is common for the researchers during the data collection process to offer a promise of confidentiality that they will

626 Hendrick, above n 578, 135, 142.

627 David B Resnik, 'Genomic Research Data: Open vs Restricted Access' (2010) 32(1) *IRB: Ethics and Human Research* 2.

628 Lievesley, above n 128; Arja Kuula and Sami Borg, 'Open Access to and Re-Use of Research Data - The State of the Art in Finland' (Finnish Social Science Data Archive 2008) 7-13.

629 See Howard Bauchner, 'Protecting Research Participants' (2002) 110 *Pediatrics* 402; Jean E Wylie and Geraldine P Mineau, 'Biomedical Databases: Protecting Privacy and Promoting Research' (2003) 21(3) *TRENDS in Biotechnology* 113.

630 Anonymous, 'Recommendations on Confidentiality and Research Data Protections', above n 624, 2.

631 See Craig Lawson, 'Research Participation as a Contract' (1995) 5(3) *Ethics and Behavior* 205; Hendrick, above n 578, 135.

treat any data or information disclosed to them as confidential information.[632] The promise of confidentiality could be given verbally or written on the consent form, interview script, survey form, recruitment letter or brochure.[633] The promise of confidentiality given by the researchers minimise the research participant's concerns over disclosure of data and information collected from them.[634] In the presence of such a promise, the research participants will feel free to disclose confidential information to researchers without fear that the information will later be made public.[635] Due to its effectiveness in increasing research participants' cooperation rates, most researchers treat the pledge or promise of confidentiality as the *sine qua non* of voluntary participation in research.[636]

Where a promise of confidentiality is made, it imposes on the researcher an obligation to control disclosure of the information which the researcher collects in the course of a research or survey.[637] For the promise of confidentiality which was given orally, the US Supreme Court in the case of *Cohen v Cowles Media Company* held that the doctrine of promissory estoppels will be applied on the promisor to honour the promise of confidentiality to the information provider. It was also held by the Supreme Court that the First Amendment of the US Constitutions *per se* does not override the promisor's obligation to honour the promise of confidentiality.[638] Therefore, where a promise of confidentiality is made, the researcher has a legal duty to honour the promise regardless whether a disclosure would cause measurable harm or not.[639]

Non-disclosure duty of confidential research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

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632 See Easter, Davis and Henderson, above n 624, 13; Christian, above n 523, 4.

633 Easter, Davis and Henderson, above n 624, 13.

634 Anonymous, above n 624, 2.

635 Geoffrey R Stone, 'Discussions: Above the Law: Research Methods, Ethics and the Law of Privilege' (2002) *Public Law and Legal Theory Working Paper No 21*, <http://www.law.uchicago.edu/files/files/21.Stone_.ethics.pdf> (at 28 June 2010).

636 Privacy Protection Study Commission, 'Personal Privacy in an Information Society: The Report of the Privacy Protection Study Commission' (1977).

637 See Easter, Davis and Henderson, above n 624, 13; Christian, above n 523, 4.

638 *Cohen v Cowles Media Company* (1991) 501 US 663.

639 Easter, Davis and Henderson, above n 624, 13.

4.2.8 The Right to Informational Privacy of Subjects of Research Data

Subjects of research data are individuals whose personal information has been collected by the researchers. Various reports and studies indicate that the right to informational privacy of subjects of research data impedes the objective of enabling open access to and re-use of publicly funded research data.[640] Respondents of research conducted by Margaret Henty in Australian universities have highlighted the issue of privacy as a major issue.[641] Jerome Clubb also reports privacy issue as among the obstacles in sharing of research data in the social sciences.[642]

Among the research data which is subject to the right to informational privacy are private and sensitive information relating to age, ethnicity, residential address, religious belief, sexual orientation, political affiliations, financial records, lifestyles, and private activities. Photographs, videotapes, audiotapes, drawings or diaries depicting intimate acts, behaviours or body parts are also subject to the right to informational privacy.[643] The right to informational privacy also exists in research data collected from legal agreements, employment records, medical records, criminal conviction histories and financial statements.[644] Research data on deviant behaviours such as drug and alcohol abuse, gambling, prostitution, abortion or a data subject's attitudes on controversial issues and deviant behaviours are also protected under the right to informational privacy.[645]

The right to informational privacy is both a personal right and personal freedom of the individual based on autonomy, dignity, liberty and security interests.[646] The right

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640 See NIH Data Sharing Workbook 2004; Uhlir and Schroder, above n 125, 209; Manyika et al, above n 512, 119; Christopher Mackie and Norman Bradburn, 'Improving Access to and Confidentiality of Research Data: Report of a Workshop' (National Research Council Committee on National Statistics, 2000); Wylie and Mineau, above n 629, 113; Jeantine E Lunshof et al, 'From Genetic Privacy to Open Consent' (2008) 9 *Nature Reviews Genetics* 407.

641 Henty, above n 549, 7.

642 Clubb et al, above n 528, 60.

643 See Hendrick, above n 578, 136; Anne Sofia Fink, 'The Role of the Researcher in the Qualitative Research Process. A Potential Barrier to Archiving Qualitative Data' (2000) 1(3) *Forum: Qualitative Social Research*, <http://www.qualitative-research.net/index.php/fqs/article/viewArticle/1021/2201> (at 2 July 2011).

644 Anonymous, 'Current Issues in Research Ethics: Privacy and Confidentiality', <http://ccnmtl.columbia.edu/projects/cire/pac/foundation/index.html> (at 28 June 2010).

645 Privacy Protection Study Commission, above n 636.

646 Ted Palys and John Lowman, 'Ethical and Legal Strategies for Protecting Confidential Reasearch Information' (2000) 15(1) *Canadian Journal of Law and Society* 39.

to informational privacy which prohibits dissemination of personal information to other parties has been described as "the right to be left alone" as well as the right of "informational self-determination.[647] The essence of the right to informational privacy is the understanding that individuals can legitimately expect their personal information not to be made available to other individuals and organisations. Even where the personal information is held by another party, the right to informational privacy empowers the individual to exercise a substantial degree of control over disclosure of the personal information and its use.[648]

The right to informational privacy is recognised in the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data. The "personal data" is defined as personal information relating to an identified or identifiable individual who is referred to as "data subject".[649] To protect the personal information of identified or identifiable data subject, the OECD has introduced the "purpose specification principle" and "use limitation principle". The first principle requires the subsequent use of personal information to be limited only for purposes which are compatible with the purposes for which it is specified prior or during data collection.[650] The second principle prohibits disclosure, making available and use of personal information other than for the specified purposes, unless there is consent from the data subject or by the authority of law.[651]

In most cases, subjects of research data allow their personal information to be collected on the understanding that the personal information will be used only by researchers and only in a particular way.[652] The need for fresh consent arises where the personal information is to be used in a way that was not anticipated when consent

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647 See Bauchner, above n 629, 402; Marc Rotenberg, 'Preserving Privacy in the Information Society', <http://www.unesco.org/webworld/infoethics_2/eng/papers/paper_10.rtf.> (at 2 February 2011); KA Taipale, 'Data Mining and Domestic Security: Connecting the Dots to Make Sense of Data' (2003) v *The Columbia Science and Technology Law Review* 50.

648 Nehaluddin Ahmad, 'The Right to Privacy and Challenges: A Critical Review' (2008) 5 *Malayan Law Journal Articles* 122.

649 Organisation for Economic Co-Operation and Development (OECD) Guidelines on the Protection of Privacy and Transborder Flows of Personal Data – Part One: General Definitions "personal data".

650 Ibid Part Two. Basic Principles of National Application – Purposes Specification Principle.

651 Ibid Part Two. Basic Principles of National Application – Use Limitation Principle.

652 Mark Israel and Iain Hay, 'Confidentiality' in *Research Ethics for Social Scientists* (Sage Publications, London, 2006) 77.

was first gained by the researchers from subjects of research data.[653] As far as the right to informational privacy of subjects of research data is concerned, the International Declaration on Human Genetic Data provides that biological samples of a human being should not be used for a different purpose that is incompatible with the original consent unless the prior, free, informed and express consent of the person concerned is obtained.[654] The HUGO's Statement on the Principle Conduct of Genetic Research also recognises the need to protect a data subject from unauthorised access to genetic information. Under the principle of genetic exceptionalism, genetic information is regarded as highly sensitive personal information which needs a higher level of protection than other kinds of personal information.[655]

From legal perspectives, the right to informational privacy has been recognised as a basic human rights which protects the right of an individual to control how much of his or her thoughts, feelings or other personal information can be shared with others.[656] The recognition of the right to informational privacy is implicit in Article 12 of the UDHR:

> No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.[657]

In the UK, English common law grants individuals a right to privacy for improper disclosure and use of their personal information or from having their private details made public without their consent.[658] The legal protection of the right to informational privacy in the era of the internet and ICT is focused on the ability of individuals to protect and control the personal information held by others and who should be given access to personal information which is to be disseminated by

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653 Peter Singleton and Michael Wadsworth, 'Consent for the Use of Personal Medical Data in Research' (2006) 333 *British Medical Journal* 255.

654 Andanda, above n 545, 174.

655 Spinello, above n 601, 29.

656 Susan J Cram and Keith S Dobson, 'Confidentiality: Ethical and Legal Aspects for Canadian Psychologists' (1993) 34(3) *Psychology* 347.

657 Rotenberg, above n 647.

658 Easter, Davis and Henderson, above n 624, 14.

electronic means.[659] Although the concept of privacy and data protection has developed over the centuries to the point where most countries now have legislation regulating theses issues, new technologies pose an enormous threat to the protection of privacy and personal data.[660]

Lord Hoffman, in the case of *R v Brown*, acknowledges the need to protect informational privacy in the era of the internet and ICT. His Lordship states in his judgment:

> Vast amounts of information about everyone are stored on computers, capable of instant transmission anywhere in the world accessible at the touch of a keyboard. The right to keep oneself to oneself, to tell other people that certain things are none of their business, is under technological threat.[661]

The right to informational privacy in English common law is built upon "fair information practices" which set out the rights of those who provide their own personally identifiable information and the responsibilities of those who collect this information. These rights include the right of an individual to limit the collection and use of his personal information.[662] To protect disclosure of personal information, the concept of public disclosure has been interpreted strictly, with court cases holding that communication to one person amounts to disclosure to public.[663] To protect the personal information from being misused, the House of Lords in the case of *Campbell v MGN Limited*, has expanded the application of the tort of breach of confidence to include "misuse of private information".[664] The legal recognition of the right to informational privacy has lead to the establishment of personal data protection law which governs the collection and handling of personal data.[665] In the

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659 See Rotenberg, above n 647; Meredith L Golden, Robert R Downs and Kent Davis-Packard, 'Confidentiality Issues and Policies Related to the Utilization and Dissemination of Geospatial Data for Public Health Applications' (National Aeronautics and Space Administration, 2005); Wikipedia, 'Information Privacy' (2010), <http://en.wikipedia.org/wiki/Information_privacy> (at 28 June 2010).

660 Karthick Ramachandran, Thomas Margoni and Mark Perry, 'Clarifying Privacy in the Clouds' (Paper presented at the Cyberlaws 2011: The Second Conference on Technical and Legal Aspects of the e-Society, Gosier, Guadeloupe, France, 23 -28 February 2011).

661 *R v Brown* [1996] 1 All ER 545 at 555-556.

662 Rotenberg, above n 647.

663 Carol J Schrier, 'Guidelines for Record-Keeping Under Privacy and Open-Access Laws' (1980) 25(6) *Social Work* 454.

664 Campbell v MGN Limited [2004] UKHL 22.

665 Ahmad, above n 648, 124.

presence of personal data protection law, disclosure and use of personal data against the will or consent of subjects of research data will become a violation of their right.[666]

Contrary to the protection given to the right to informational privacy of subjects of research data, enabling open access to and re-use of research data presents a significant violation risk to this right. The right to informational privacy is violated wherever personal information of identified or identifiable person or persons is released in open access repository.[667] It is reported that data subjects are suspicious about the use of personal information which could violate their right to informational privacy.[668] Most researchers are aware that if the right to informational privacy is not protected, it could discourage the public from participating in research projects, especially when a study relates to sensitive issues.[669] The Canadian Institutes of Health Research's (CIHR) Consultation Paper on Developing Access to Research, reveals that several researchers have submitted that data sharing should not be a component of open access policy because of the high risk of irresponsible use of personal data.[670]

The right to informational privacy of subjects of research data has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.9 Protection of National Security

The Mckinsey Global Institute Report on Big Data states that data access can expose not only personal information and confidential corporate information, but also

666 Godard et al, above n 435, S89.

667 See Anonymous, above n 624, 1; Wikipedia, 'Privacy' (2010), <http://en.wikipedia.org/wiki/Privacy> (at 29 June 2010).

668 Borgman, above n 438.

669 See Gary B Melton, 'Must Researchers Share Their Data?' (1988) 12(2) *Law and Human Behavior* 160; Ministry of Justice, 'The Knowing or Reckless Misuse of Personal Data: Introducing Custodial Sentences - Consultation Paper CP22/09' (Government of UK, 2009); Schrier, above n 663, 454; Panel on Data Access for Research Purposes, above n 392; Erin E Kenneally and Kimberly Claffy, 'An Internet Data Sharing Framework for Balancing Privacy and Utility' (Paper presented at the Proceedings of Engaging Data: First International Forum on the Application and Management of Personal Electronic Information, Cambridge, MA, USA, 2009) 3.

670 Anonymous, above n 47.

national security.[671] In relation to this, the US Committee on Ensuring the Utility and Integrity of Research Data in Digital Age has listed research related to nuclear, radiological, and biological threats; chemicals and explosives; human and agricultural health systems; and information technology infrastructure as research that may contain data and information which is a subject of national interests and security.[672] The Committee also suggests that research be kept secret if it pertains to intelligence, military or terrorist activities.[673]

The CODATA Berlin Conference Discussion Paper report indicates that restrictions on access to and use of research data for reasons of national security presents a complex picture, as almost any data, information and scientific finding can play an important part in warfare and/or terrorism.[674] In dealing with the conflicts between data access and national security, Schaffer argues that advocates of open access are not proposing that institutions allow unfettered access to sensitive data that could place the security of a nation or the world at risk.[675] The UDHR and the ICCPR in recognising the public right to seek, receive and impart information and ideas, expressly state that these rights are not without limitation.[676] The ICCPR also states that the exercise of the rights to impart information carries with it a special duty and responsibility. The rights to receive and impart information are subject to certain restrictions including for the protection of national security or of public order as shall be provided by law.[677]

From a legal perspective, governments can legitimately restrict openness for the protection of national security.[678] Where a law is in place to protect national security and public interests or where the research data contains information the disclosure of

671 Manyika et al, above n 512, 11.
672 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 68.
673 Ibid.
674 Schroder, above n 77, 30.
675 Schaffer, above n 510; Stephen Hilgartner and Sherry I Brandt-Rauf, 'Data Access, Ownership, and Control: Toward Empirical Studies of Access Practices' (1994) 15 *Science Communication* 356.
676 See Art 19, 'The Universal Declaration of Human Rights' (1948) *United Nations*, <http://www.un.org/en/documents/udhr/> (at 2 March 2010); Art. 19, 'International Covenant on Civil and Political Rights' (1966) *United Nations*, <http://www.cirp.org/library/ethics/UN-covenant/> (at 22 June 2010).
677 Art 19.3, 'International Covenant on Civil and Political Rights', above n 676.
678 Alasdair Roberts, 'National Security and Open Government' (2004) 9(2) *Georgetown Public Policy Review* 69.

which is prejudicial to national security, disclosure of the research data needs to be restricted.[679] The protection of national security as the obstacle which restricts data sharing is reported by Dorothy Nelkin in her article on the control of scientific information.[680] Schroder, Hendrick, Hilgartner and Brandt-Rauf also report national security considerations as a compelling reason for non-release or non-publication of research data.[681]

The protection of national security has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.10 Novelty Requirements in Patent Law

While it was established in the previous chapter that enabling open access to and re-use of publicly funded research data can preserve the academic mission of universities from being undermined by patenting and commercialisation of academic research, the objective of enabling open access to and re-use of research data that requires data to be shared openly and without delay may also conflict with the novelty requirements in patent law. The conflict between the novelty requirements in patent law and data sharing is raised by Anna Salleh,[682] Margo Bagley,[683] Rebecca Eisenberg,[684] and Bhaven N Sampat.[685] Under the novelty rules, a patent will not be issued or will be declared invalid, if the claimed invention is disclosed to the public prior to the filing of patent application.[686] The novelty of invention is evaluated under most patent laws in light of prior art which requires that the invention not be disclosed prematurely.[687]

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679 See Anonymous, above n 47; Arzberger et al, above n 270, 146.

680 Dorothy Nelkin, 'Intellectual Property: The Control of Scientific Information' (1982) 216 *Science* 706.

681 See Schroder, above n 77, 30; Hendrick, above n 578, 133; Hilgartner and Brandt-Rauf, above n 675, 356.

682 Salleh, above n 465.

683 Margo A Bagley, 'Academic Discourse and Proprietary Rights: Putting Patents in Their Proper Place' (2006) XLVII(2) *Boston College Law Review* 218.

684 Eisenberg, above n 200, 1013-1031.

685 Bhaven N Sampat, 'The Bayh-Dole Model in Developing Countries: Reflections on the Indian Bill on Publicly Funded Intellectual Property' (2009) *Policy Brief Number 5*, <http://kms1.isn.ethz.ch> (at 16 January 2010).

686 Lipkus, Mackie and Singer, above n 449, 1.

687 Douglas Lichtman, Scott Baker and Kate Kraus, 'Strategic Disclosure in the Patent System,' (2000) 53(6) *Vanderbilt Law Review* 2175.

Premature public disclosure of an invention prejudices the patent applications because an invention which has been disclosed in the past is no longer considered as novel since the invention becomes a prior art.[688] Prior art exists whenever an invention is disclosed to the public, whether in or out of the patent area.[689] The UK Patents Act refers to disclosure as making available the information about an invention by written or oral description, by use or in any other way.[690] It follows that, disclosure of the research data about an invention to the public would amount to disclosure which defeats the novelty requirements in patent law.

The novelty requirements in patent law can have a profound effect on the objective of enabling open access to and re-use of publicly funded research data. The novelty requirements in patent law hinder early disclosure of research data in public research since the opportunity to patent an invention is lost when it is publicly disclosed.[691] In the presence of the novelty requirements in patent law, the timing and amount of research data about an invention that a researcher disclosed in open access repository has an adverse effect on the patentability of their inventive research outputs.[692] In pursuit of patent, disclosure of research data about an invention needs to be restricted and delayed so as not to defeat novelty requirements.[693]

It is reported by the US Committee on Ensuring the Utility and Integrity of Research Data in Digital Age that, in areas of potential commercial application, patent considerations can limit or delay the accessibility and re-usability of research data.[694] The Committee also accepts the fact that an academic researcher may temporarily withhold disclosure of data and information in order to file a patent or to develop a commercial product, even when the research is publicly funded.[695] The CIHR's Consultation Paper on Developing Access to Research suggests that access to research be restricted until patents have been filed. It is also suggested in the

688 See Christie et al, above n 159, 72; Lipkus, Mackie and Singer, above n 449, 4.
689 See Patents Act 1990 (Cth), Schedule 1.
690 Patents Act 1977 (UK), s 2(2) – Novelty.
691 See Yasser M Gadallah, 'Intellectual Property Policy for Universities and Research Institutes and Economic Development - The Egyptian Case' (2010) 41(4) *International Review of Intellectual Property and Comptetition Law* 452; Nelkin, above n 680, 706.
692 Lipkus, Mackie and Singer, above n 449.
693 Christie et al, above n 159, 48.
694 Ibid 6.
695 Ibid 69.

consultation paper that certain materials may be restricted in order to exploit the intellectual property for commercial gain by way of patent.[696] Therefore, despite the objective of patent law to avert proprietary claims, secrecy and to provide incentives for further invention, novelty requirements in patent law restrict open access and timely disclosure of research data about an invention.

The novelty requirements in patent law have been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.2.11 Lack a Legal Duty to Ensure Data Quality

Data quality refers to accuracy, completeness and 'fitness for use' of a specific data set.[697] A particular data set will be unfit for use if the data is inaccurate or erroneous.[698] Nelson in his article on open access to data states that one of the main barriers to data sharing is concern about quality of the data.[699] Weiner and Embi in their paper on re-use of clinical data reveal that research data has often been criticised because of its quality and comprehensiveness were not up to research standards.[700] A report prepared for the US Congressional Research Service found that inaccurate data is one of the primary reasons for misleading results in research.[701]

To ensure data quality, the OECD Principle on Data Quality which applies to personal data requires data to be relevant to the purposes for which it is to be used, and to the extent necessary for those purposes, should be accurate, complete and kept up-to-date.[702] The US Committee in its published report on Ensuring the Utility and

696 Anonymous, above n 47.

697 See Jeffrey W Seifert, 'CRS Report for Congress: Data Mining and Homeland Security: An Overview' (Congressional Research Service, 2007) CRS-22; Earl F Eipstein, Gary J Hunter and Aggrey Agumya, 'Liability Insurance and the Use of Geographical Information' (1998) 12(3) *International Journal of Geographical Information Science* 203; Aggrey Agumya and Gary J Hunter, 'A Risk-Based Approach to Assesing the 'Fitness for Use' of Spatial Data' (1999) 11(1) *URISA Journal* 33.

698 See Eipstein, Hunter and Agumya, above n 697, 203; Agumya and Hunter, above n 697, 33.

699 Bryn Nelson, 'Data Sharing: Empty Archives' (2009) 461 *Nature* 160.

700 Weiner and Embi, above n 511, 359.

701 Seifert, above n 697, CRS-22.

702 Organisation for Economic Co-Operation and Development (OECD) Guidelines on the Protection of Privacy and Transborder Flows of Personal Data – Data Quality Principle.

Integrity of Research Data in the Digital Age states that data providers have important roles in ensuring data quality. [703] Data providers consist of the individuals and organisations formally or informally responsible in disseminating data to others. [704] Data providers could be the owners or the producers of those data. In other cases, data providers could be the intermediary that is responsible for disseminating the data such as the repository centre where data is deposited.[705] Between the data owner, data producer and the intermediary, it is the data producer who is ultimately responsible to ensure the quality of research data which is shared with others. Data producers are the person or organisation who generate data, whether through observations, experiments, simulations or the gathering of information from other sources.[706]

Data quality has become a matter of serious concern as research data is known to be produced by researchers of diverse expertise and backgrounds.[707] Even if the research data was prepared by experts, at each point along the data production chain, a likelihood of errors exists which compromises data quality.[708] It is widely accepted that all data, whether prepared by experts or otherwise, is susceptible to error and inaccuracy.[709] The traditional way to ensure data quality is by submitting data and results to the scrutiny of other researchers through the peer review system. The peer review system allows the data and results to be judged for quality by a research community prior to its public dissemination.[710] With the enormous rate at which research data is disseminated online to the public, the process of verifying data quality becomes more complicated if not impossible. Since dissemination of digital data is done by computers with relatively little human oversight, unfit, inaccurate and erroneous data can be rapidly multiplied and widely disseminated to the public.[711]

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703 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 4.

704 Ibid.

705 Ibid 41.

706 Ibid 40.

707 Lievesley, above n 128.

708 Jennifer L Philips, 'Information Liability: The Possible Chilling Effect of Tort Claims Against Producers of Geographic Information Systems Data' (1999) 26 *Florida State University Law Review* 748.

709 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 40.

710 Ibid 3.

711 Ibid 34.

Enabling open access to and re-use of publicly funded research data means that potential data users could extend beyond the research community.[712] The existence of data users among the non-research community, such as policy makers, educators, the media, the courts and others, has increased the risks arising from incomplete, unfit, erroneous or inaccurate data. Data users who lack knowledge on data production and analysis may not be able to assess the quality of particular data or data sets.[713] The data users' ignorance may expose them to loss or damages as a result of their reliance on incomplete, unfit, inaccurate or erroneous research data.

Where research data is disseminated online to various categories of users, it is very difficult to assess how widely the damage will extend. By releasing the research data online in open access repository, inaccurate data may be used by many, perpetuating the damage or causing multiple damages.[714] Incomplete, unfit, inaccurate or erroneous data can cause loss or damage to its users. Incomplete, unfit, inaccurate or erroneous research data can also have substantial social and economic impacts to the society at large.[715] The potential loss and damages arising from lack of data quality, requires the law to ascertain who should have a legal duty to ensure the quality of the research data.[716]

Under the current theory of negligence, data providers will only be found liable if they owe a duty of care to the person who suffers loss and damages resulting from their reliance on the data supplied by them.[717] The negligence cases decided so far indicate that the duty of care is owed by the data providers as a result of their act of selling the information to the specific users who rely on their information.[718] Cheryl Foong analysis of the law in Australia and the UK on data providers' liability for

712 Ibid 41.

713 Ibid 41; Philips, above n 708, 749.

714 Cheryl Foong, 'Open Content Licensing of Public Sector Information and the Risk of Tortious Liability for Australian Governments' (2010) 17(2) *Murdoch University Electronic Journal of Law* 23, <https://elaw.murdoch.edu.au/index.php/elawmurdoch/issue/current> (at 17 August 2011).

715 See Eipstein, Hunter and Agumya, above n 697, 203; Agumya and Hunter, above n 697, 33; Richard Y Wang and Diane M Strong, 'Beyond Accuracy: What Data Quality Means to Data Consumers' (1996) (Spring) *Journal of Management Information Systems* 1.

716 Manyika et al, above n 512, 11-12.

717 Leon Green, 'The Duty to Give Accurate Information' (1965) 12 *UCLA Law Review* 464.

718 David Rhind, 'Data Access, Charging and Copyright and their Implications for Geographical Information Systems' (1992) 6(1) *International Journal of Geographical Information Systems* 27.

providing erroneous or inaccurate information, finds that where the information is provided online voluntarily or without expectation of economic profit, a court is unlikely to impose a duty of care against the data provider. According to Foong even if the data provider is held to be subject to a duty of care, the duty would be of a relatively low standard compared to the standard of care which may be expected from a firm or an individual providing specific information or advice to another for a fee. Foong's legal analysis also found that, even if there is a duty of care to be observed, the duty is less likely to be breached where the information providers have adhered to reasonable information management practices, and where there are clear disclosures or warnings about the limitations of the information.[719]

The fact that the law does not impose or only imposes a low duty of care on voluntary, non-profit data providers, indicates lack of a legal duty imposed on open access data providers to ensure data quality. The lack of such a legal duty, requires the data users to weigh the benefits of open access and re-use of the research data against the risks of obtaining inaccurate or erroneous data.[720] Raka Banerjee argues that the call for open data should go hand in hand with a call for better quality data. According to Banerje, inaccurate data is of little use to any researcher, statistician, or other users and indeed it can result in significant harm. Further according to Banerjee, without placing equal emphasis on collecting high quality data, few benefits can be reaped from the release of data to the public.[721] van Grieken's thesis on Dutch open data found that the quality of data is one of the most important requirement for the re-use of the data.[722] In Sweden, 62% of the professors surveyed cite uncertainty about the quality of data as among important reasons for not reusing digital data.[723]

719 Foong, above n 714, 23.

720 See Seifert, above n 697, CRS-22; Eipstein, Hunter and Agumya, above n 697, 203.

721 See Raka Banerjee, 'Open Data is Not Enough' (2011), <http://blogs.worldbank.org/developmenttalk/open-data-is-not-enough-0> (at 16 August 2011); 'Kenya Leads on Open Data in Developing Countries' (2011) *The World Bank* <http://data.worldbank.org/news/kenya-leads-on-opendata-in-dev-countries> (at 16 August 2011).

722 JPS van Grieken, Open Data: A Design for the Provisioning of Dutch Government Public and Geo-Spatial Transport Data (Bachelor Degree Thesis, University of Groningen, 2011).

723 Carina Carlhed and Iris Alfredsson, above n 61.

Lack of a legal duty to ensure data quality has been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

4.3 SUMMARY

The present chapter has identified the legal impediments to the objective of enabling open access to and re-use of publicly funded research data. These legal impediments arise when the existence or the absence of legal rights and duties have the effect of restricting, obstructing, hindering or slowing down the objective of enabling open access to and re-use of publicly funded research data. The legal impediments which have been identified are hereby summarised in Table 4.1 below.

Table 4.3.1 Legal impediments to open access and re-use

LEGAL IMPEDIMENTS	HOW DOES THE LEGAL IMPEDIMENT ARISE?
Intellectual property protection in research data	Access to and re-use of the research data protected by intellectual property rights is restricted and subject to permission from data owner.
Ambiguity about ownership of research data	The ambiguity hinders data sharing/self-archiving practices/open access participations among university researchers as the researchers are unsure whether they have the right to deposit the research data in open access repository.
Data owner's exclusive rights in research data	A data owner who does not want to lose control over the research data may exercise their exclusive rights by refusing to release the research data in open access environment.
The restrictive scope of the legitimate use of research data	Data users are in a state of uncertainty whether their usage is within the permitted acts, preventing them from utilising the research data deposited in open access repositories.
Complex and lengthy licensing procedures for research data	Licensing of research data which are protected under copyright law is costly and time consuming, and is not well suited to be used in the digital environment.
Author's moral right of integrity	Creator/originator of the research data could prevent data users from making significant alteration or modification to the research data by claiming that the act tarnishes their honour or reputation.
Non-disclosure duty of confidential research data	Disclosure of research data which are subject to promise of confidentiality or under non-disclosure agreement is prohibited unless the research participants can be re-contacted for

	permission.
The right to informational privacy of subjects of research data	Disclosure and use of personal information against the will or consent of identified or identifiable data subjects will violate their right to informational privacy.
Protection of national security	Disclosure of research data which is classified as prejudicial to national security is restricted.
Novelty requirements in patent law	Researchers are required by the law to restrict, limit, delay or withhold disclosure of research data until the patent application has been filed .
Lack of a legal duty to ensure data quality	Since open access data providers have no or low level of legal duty to ensure data quality, data users are at risks of accessing and re-using incomplete, unfit, inaccurate or erroneous research data.

The legal impediments identified above, if existing in Malaysia, could impede the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. Therefore, it is deemed necessary to determine whether the legal impediments which have been identified in this chapter do exist within the Malaysian legal landscape. Aware of the need to determine the legal situation in Malaysia, the proceeding chapter is directed towards answering the next research question: To what extent do these legal impediments exist under the Malaysian laws?

CHAPTER 5
ANALYSIS OF THE MALAYSIAN LAWS

5.1 OVERVIEW

Chapter 4 identified 11 legal impediments to the objective of enabling open access to and re-use of publicly funded research data.[724] Although the legal impediments were identified based on an examination of the literature of other countries, there is a possibility that similar legal impediments also exist in Malaysia. As the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities, it is important to determine whether such legal impediments exist in Malaysia. The research question addressed in this chapter explores the extent to which the legal impediments to open access to and re-use of publicly funded research data exist under the Malaysian laws.

In answering the research question, this chapter analyses the Malaysian laws underpinning the legal impediments identified in this thesis. The copyright, confidentiality, privacy, national security, patent and tort laws in Malaysia are analysed. Since Malaysia adopts a common law legal system, the relevant cases decided by the Malaysian courts are also analysed along with the statutes. Where necessary, a comparison is made with similar statutes and cases from other common law countries i.e. Australia, the UK and the US, which could help this thesis to determine the extent to which the legal impediments exist under the Malaysian laws.

5.2 LEGAL ANALYSIS

5.2.1 Intellectual Property Protection of Research Data

Although there is no *sui generis* law which protects database rights in Malaysia, the research data could be protected under the *Malaysian Copyright Act 1987*. The *Malaysian Copyright Act* protects literary works, musical works, artistic works, films, sound recordings and broadcasts which are original in character and have been

[724] See 4.2 – The Legal Impediments.

written down, recorded or otherwise reduced to material form.[725] The term "material form" includes any form (whether visible or not) of storage from which the work or derivative work, or a substantial part of the work or derivative work can be reproduced.[726] A research data which is written, recorded or reduced in digital format and can be reproduced is eligible for copyright protection as literary work, musical work, artistic work, film or sound recording.

Under the *Malaysian Copyright Act*, "literary works" include writing; tables or compilations (whether or not they are expressed in words, figures or symbols and whether or not in a visible form); and computer programs.[727] "Computer program" is further interpreted as an expression in any language, code or notation, of a set of instructions (whether with or without related information) intended to cause a device having an information processing capability to perform a particular function.[728] While the *Malaysian Copyright Act* does not give any interpretation to the term "compilation", the *US Copyright Act 1976* defines "compilation" as a work formed by the collection and assembling of pre-existing materials or of data that is selected, coordinated or arranged in such a way that the resulting work as a whole constitutes an original work of authorship.[729] Based on the broad interpretation given to the term literary works under the *Malaysian Copyright Act* research data, whether published data or unpublished data which exist in texts (survey data, questionnaires, interview guides), numeric (equations, statistics) and tables or compilations (database, data sets), could be protected as copyright works.

Research data in the form of graphic works and photographs is eligible for protection under the *Malaysian Copyright Act* as "artistic works" irrespective of their artistic quality.[730] The term "graphic works" includes drawings, diagrams, maps, charts or plans. As for research data in the form of video recording, it is eligible to be protected as "film", which has been interpreted as any fixation of a sequence of

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725 See *Copyright Act 1987* (Malaysia), ss 7(1)(a), 7(3)(a), 7(3)(b) - works eligible for copyright. See also, *Radion Trading Sdn Bhd v Sin Besteam Equipment Sdn Bhd &* Ors [2010] 9 MLJ 656.

726 *Copyright Act 1987* (Malaysia), s 3 Interpretation – material form.

727 Ibid s 3 Interpretation – literary work.

728 Ibid s 3 Interpretation – computer program.

729 *Copyright Act 1976*, Pub L No 94-553, 90 Stat 2541 (US), s 101 Definitions - compilation.

730 *Copyright Act 1987* (Malaysia), s 3 Interpretation – artistic work.

visual images on material of any description.[731] The term "fixation" means the embodiment of sounds, images or both, or the representation thereof, in a material form sufficiently permanent or stable to permit them to be perceived, reproduced or otherwise communicated during a period of more than transitory duration.[732]

Research data in the form of audio presentation and interview records are also eligible for copyright protection as "sound recording". The term "sound recording" is interpreted as any fixation of a sequence of sounds or of a representation of sounds capable of being perceived aurally and of being reproduced by any means, but does not include a soundtrack associated with a film.[733] As for research data which is published (in journals, reports, books, conference proceedings or manuscripts) it is eligible for copyright protection as published editions of works under the *Malaysian Copyright Act*.[734] The copyright protection given to the published editions of work cover literary, artistic and musical works. However, the protection is restricted to the making of a reproduction of the typographical arrangement of the published edition.[735]

Further analysis of the *Malaysian Copyright Act* found that research data is also eligible for copyright protection as derivative work. The *Malaysian Copyright Act* protects derivative works as original works whereby collections of works or collections of mere data, whether in machine readable or other form, will be eligible for copyright, which, by reason of the selection and arrangement of their contents constitutes intellectual creation.[736] The copyright protection given to derivative works means that raw data, processed data and archived data the contents of which are selected and arranged to fulfil the threshold of originality is eligible for copyright protection.

Based on the wide scope of works that are eligible for copyright protection, the issue is not whether research data is a proper subject of copyright protection. The real issue is whether the research data has sufficient originality to qualify for protection.

731 Ibid s 3 Interpretation – film.
732 Ibid s 3 Interpretation – fixation.
733 Ibid s 3 Interpretation – sound recording.
734 Ibid s 9(1) – copyright in published editions of works.
735 Ibid s 9(3) – copyright in published editions of works.
736 Ibid s 8(1) – derivative works.

This issue is raised considering that research data is essentially a large amount of information, facts and figures which have been collected from numerous sources.[737] According to a Malaysian intellectual property expert, the protection of copyright in Malaysia requires the satisfaction of only a low level of originality.[738] The low level of originality means that the labour and expense or so-called "sweat of the brow" that goes into gathering data for a factual compilation is sufficient to warrant copyright protection.[739] In *Lau Foo San v Government of Malaysia*, the Federal Court held that to rebut originality, it must be shown that the appellant's works are nothing more than direct tracings of other original works or drawings.[740]

The Malaysian position seems to be in contrast with the US court decision in the case of *Feist Publications v Rural Telephone Services Co,*[741] and in a more recent judicial decision in Australia, in the case of *Telstra Corporation Limited v Phone Directories Company Pty Ltd.* In Telstra case, Gordon J ruled that where an author or authors of a compilation can clearly be identified; and it can be shown that the compilation is original in the sense that it is the product of: i) some "independent intellectual effort"; the exercise of "sufficient effort of a literary nature"; involves a "creative spark"; or the exercise of "skill and judgment", then it is likely to be protected by copyright.[742] The courts in the US and Australia have fixed a higher level of originality. In both countries, the sweat of the brow doctrine has been rejected, whereby the focus is not on labour or expense but on independent intellectual effort in the creation of a particular work.[743] Due to the low level of originality required in Malaysia, it would be much easier for research data to be protected as intellectual property rights in Malaysia compared in the US or Australia.

737 Wang, above n 599, 77.

738 Ibid.

739 Anne Flahvin, 'White, Yellow Pages Not Protected By Copyright, Court Rules', *The Australian* (online), 19 February 2010, <http://www.theaustralian.com.au/business/legal-affairs/white-yellow-pages-not-protected-by-copyright-court-rules/story-e6frg97x-1225831927178>.

740 *Lau Foo San v Government of Malaysia* (1974) 1 MLJ 28.

741 *Feist Publications Inc v Rural Telephone Service Co* 499 US 340 (1991).

742 *Telstra Corporation Limited v Phone Directories Company Pty Ltd* [2010] FCA 44. See also *IceTV Pty Limited & Anor v Nine Network Australia Pty Limited* [2009] HCA 14.

743 Joshua Henderson and Ben Coogan, 'No Copyright Protection for Telephone Directories - Telstra v Phone Directories Company' (2010), <http://www.mondaq.com/australia/article.asp?articleid=94168> (at 8 November 2010).

The legal analysis found that all types of research data which exist in various forms are eligible to be protected as copyright works under the *Malaysian Copyright Act*. The research data which is eligible for intellectual protection under the *Malaysian Copyright Act* is illustrated in Table 5.2.1 below.

Table 5.2.1 Intellectual property protection of research data

CATEGORY OF WORKS	FORMS OF EXPRESSION	TYPES OF RESEARCH DATA ELIGIBLE FOR COPYRIGHT PROTECTION
Literary works	Writings	Textual records: survey data, questionnaires, interview guides, a spreadsheet of ocean temperatures Numerical scores: equations, statistics, a list of numbers or dates (as copyright does not protect mere facts, ideas or information, only the particular form of original expression of the numerical scores is protected by copyright law.)
	Table or compilation (in words, figures or symbols)	database or data sets
Artistic works	Graphics	All forms of research data represented in graphic images whether fixed such as diagrams, maps, tables, drawings, charts, plans, slides or moving (such as animations, simulations)
	Photograph	Pictorial images other than film
Film	A sequence of visual images	Videos, movies
Sound recordings	A sequence of sounds or of a representation of sounds	Audio presentation, interview records
Published Editions of Works	Published literary, artistic or musical works	Published data (in journals, reports, book, conference proceedings or manuscripts)
Derivative works	Collections of works or collections of mere data which constitute intellectual creation	Raw data, processed data or archived data where the selection and arrangements of its contents fulfil the threshold of originality.

5.2.2 Ambiguity About Ownership of Research Data

Under the *Malaysian Copyright Act*, the first ownership of copyright in literary, musical, artistic, film or sound recording shall vest initially in the author.[744] The term "author" has been given a broad interpretation to include the writer, the composer, the artist and the person by whom the arrangement for the taking of photograph or the making of the film or recording were undertaken.[745] The *Malaysian Copyright Act* provides that, in the case of joint authorship, copyright shall subsist in every work eligible for copyright, if any of the joint authors is, at the time when the work is made, a qualified person.[746] A "Qualified Person" has been interpreted in the *Malaysian Copyright Act* as a person who is a citizen of or a permanent resident in Malaysia.[747]

The *Malaysian Copyright Act* states that, where the work is made in the course of an author's employment, copyright ownership shall be deemed to be transferred to the author's employer, unless otherwise stipulated in any agreement between the parties excluding or limiting such transfer.[748] It is clear that ownership of research data that is created by an employee of Malaysian public universities, is subject to the "work-for-hire" doctrine. Despite the adoption of the doctrine, ambiguity about ownership of publicly funded research data in Malaysian public universities is far from resolved. It is unclear whether creating/originating research data is in or outside the course employment. It is also unclear whether publicly funded research data created by a university employee is subject to "work-for-hire" doctrine or subject to an agreement with the public research funding agencies. Therefore, there is ambiguity about ownership of publicly funded research data that is created by a university employee both in or outside the course of employment.

As for ownership of publicly funded research data created by a non-employee university researcher (such as visitor, associate, adjunct, fellow of the university) and university student, the situation is also ambiguous. The *Malaysian Copyright Act* provides that the copyright of a commissioned work under a contract of service

744 *Copyright Act 1987* (Malaysia), s 26(1) – first ownership of copyright.
745 Ibid s 3 Interpretation - author.
746 Ibid s 10(1) – qualification for protection.
747 Ibid s 3 Interpretation – qualified person.
748 Ibid s 26(2)(b) – first ownership of copyright.

or apprenticeship shall be deemed to be transferred to the person who commissioned the work.[749] Despite the above provision, it is unclear whether publicly funded research data created by a non-employee university researcher and a university student could be classified as a commissioned work under a contract of service or apprenticeship. It is also unclear whether publicly funded research data created by a non-employee university researcher and a university student could be classified as work made under the Government's direction or control which vests ownership in the Government.[750] Therefore, there is ambiguity about ownership of publicly funded research data created by a non-employee university researcher and a university student.

Under the *Malaysian Copyright Act*, publicly funded research data created by a university researcher under a research collaboration may be owned as a work of joint authorship. The *Malaysian Copyright Act* defines the "work of joint authorship" as a work produced by the collaboration of two or more authors in which the contribution of each author is not separable from the contribution of the other author or authors.[751] Although publicly funded research data created under a research collaboration can be jointly owned, it is unclear whether the research data created by a university researcher under research collaboration with a non-university researcher will be jointly owned among the collaborating researchers or will be jointly owned by their employers or the public research funding agency.

The legal analysis found that, there is ambiguity about ownership of publicly funded research data under the Malaysian law. Ambiguity about ownership of publicly funded research data in Malaysian public universities is illustrated in Table 5.2.2 below.

Table 5.2.2 Ambiguity about ownership of research data

OWNERSHIP OF PUBLICLY FUNDED RESEARCH DATA	THE AMBIGUITY
Created by a university employee	Whether publicly funded research data created by a university employee in the course of employment is owned by the employing university or the public research

749 Ibid s 26(2)(a) – first ownership of copyright.

750 Ibid s 26(3) – first ownership of copyright. For the purpose of s 26(3), "Government" means the Government of Malaysia or the Government of any State within Malaysian Federation. See *Copyright Act 1987* (Malaysia), s 3 – Interpretation - Government.

751 *Copyright Act 1987* (Malaysia), s 3 Interpretation – work of joint authorship.

	funding agency? Whether publicly funded research data created by a university employee outside the course of employment is owned by the researcher or the public research funding agency?
Created by a non-employee university researcher (such as visitor, associate, adjunct, fellow of the university) and a university student	Whether publicly funded research data created by a non-employee university researcher is owned by the researcher, the employing university or the public research funding agency? Whether publicly funded research data created by a university student is owned by the student, the university or the public research funding agency?
Created by a university researcher under research collaboration with a non-university researcher	Whether publicly funded research data is jointly owned among the collaborating researchers or is jointly owned by their employers or the public research funding agency?

5.2.3 Data Owner's Exclusive Rights in Research Data

Under the *Malaysian Copyright Act*, copyright in works, films or recordings shall be the exclusive right to control the reproduction in any material form; the communication to the public; the performance, showing or playing to the public; the distribution of copies to the public by sale or other transfer of ownership; and the commercial rental to the public; of the whole or substantial part thereof, either in its original or derivative form.[752]

Under the *Malaysian Copyright Act*, these exclusive rights exist in literary, musical, artistic work, film, sound recording and derivative work which is protected as copyright.[753] The Act provides that any person who does or causes any other person to do an act, the doing of which is controlled by copyright under the Act, without the license of the owner of the copyright, is infringing the copyright.[754] The Act further provides that infringements of copyright shall be actionable at the suit of the owner of the copyright, whereby the owner proprietor is entitled to relief by way of damages, injunction, accounts or otherwise.[755]

752 Ibid ss 13(1)(a), (aa), (b), (e), (f) – nature of copyright in literary, musical or artistic works, films and sound recordings.

753 Ibid s 13(1) – nature of copyright in literary, musical or artistic works, films and sound recordings.

754 Ibid s 36(1) – infringement.

755 Ibid ss 37(1), 37(5) – action by owner of copyright and relief.

Besides the copyright owner, any person (or persons) who is the assignee of the copyright works, would also be able to exercise the exclusive rights to control the reproduction, communication or distribution of the copyright works either in whole or in part.[756] Where the copyright is subject to exclusive license, the exclusive licensee shall have the same rights of action and be entitled to the same remedies as if the license had been an assignment, and those rights and remedies shall be concurrent with the rights and remedies of the owner of the copyrights under the Act.[757]

For the purpose of this thesis, the exclusive rights to control the reproduction, communication, performance, distribution, adaptation and derivative works of the copyright works are most relevant to be analysed. This is due to the fact that enabling open access to and re-use of research data will most likely involve one or more of these exclusive rights. According to the *Malaysian Copyright Act*, the word "reproduction" means the making of one or more copies of both the copyright work in any form or version, and in relation to an artistic work includes the making of a copy in three dimensions of a two-dimensional work and the making of a copy in two dimensions of a three-dimensional work.[758]

It was held in the case of *Longman Malaysia Sdn Bhd v Pustaka Delta Pelajaran Sdn Bhd*,[759] to determine whether what had been copied amounted to a substantial part of the copyright work, the Court considered the quality rather than the quantity of the unauthorised parts reproduced. In *Peko Wallsend Operations Ltd v Linatex Process Rubber Bhd*,[760] it was held by the Court that the right to control reproduction extends also to the making of an object or thing in three dimensions from a two-dimensional work (eg drawings, paintings). The phrase 'reproduction in any material form' has also been interpreted by the Malaysian Court to include any form of storage (whether visible or not) from which the work may be reproduced. Thus, the reproduction of the work in any tangible or visible form, or the reproduction of the work to be embedded in non-sensate forms such as electrical impulses on disks or CD-ROM,

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756 Ibid s 27(1) – assignment, licenses and testamentary disposition.
757 Ibid ss 38(1), 38(2) – proceedings in case of copyright subject to exclusive license.
758 Ibid s 3 Interpretation – reproduction.
759 *Longman Malaysia Sdn Bhd v Pustaka Delta Pelajaran Sdn Bhd* (1987) 1 CLJ 588.
760 *Peko Wallsend Operations Ltd v Linatex Process Rubber Ltd* (1993) 1 MLJ 225.

would be within the scope of reproduction of material forms and is subject to the scope of exclusive rights of the owner.[761]

As for the exclusive right to control the communication of copyright works, the communication to the public takes places when the work is transmitted through wire or wireless means to the public, in such a way that members of the public may access the work or live performance from a place and at a time individually chosen by them.[762] As for the exclusive right to control performance, no statutory interpretation is given by the *Malaysian Copyright Act* on the word "performance". So far there is no Court case available in Malaysia to illustrate the exclusive rights to control communication and performance of copyright work. By referring to the *UK Copyright, Designs and Patents Act 1988* (CDPA), it is found that "performance" in relation to a work in general, includes any mode of visual or acoustic presentation, including presentation by means of a sound recording, film of the work.[763]

The owner's exclusive rights to control distribution of their copyright works has been recognised in several court cases in Malaysia. In the case of *Radion Trading Sdn Bhd v Sin Besteam Equipment Sdn Bhd & Ors*, the High Court Judge, Azahar Mohamed J in his judgment rules that amongst the acts controlled by copyright law in Malaysia are the distribution of the copies of the work to the public by sale, rental, lease or lending, of the whole work or a substantial part thereof, either in its original or derivative form.[764] The judge in the case of *Class One Video Distributors Sdn Bhd & Anor v Chanan Singh Sher Singh & Anor*,[765] rules that the right to control distribution of copyright works also extends to both infringing and original works, including works which have already been published or lawfully in the market by the copyright owner or its licensees.

Under the *Malaysian Copyright Act*, making derivative work and adaptation of research data also becomes the exclusive rights of the data owner. The *Malaysian*

761 Wang, above n 599, 86.

762 *Copyright Act 1987* (Malaysia), s 3 Interpretation – communication to the public.

763 *Copyright, Designs and Patents Act 1988, c 48 (Eng)*, ss 19(2)(a),(b) - infringement by performance, showing or playing of work in public.

764 *Radion Trading Sdn Bhd v Sin Besteam Equipment Sdn Bhd & Ors* [2010] 9 MLJ 656.

765 *Class One Video Distributors Sdn Bhd & Anor v Chanan Singh Sher Singh & Anor* (1997) 3 CLJ 694.

Copyright Act has given a broad interpretation of the terms "adaptation" and "derivative works". The term "adaptation" has been interpreted to include conversion of a literary work into a dramatic work or vice versa; translation of a literary or dramatic work; or conveyance of the work in a book, a newspaper, magazine or similar periodical; arrangement or transcription of a musical work; and conversion of a literary or artistic work into a film.[766] "Derivative works" on the other hand, is translations, adaptations, arrangements and other transformations of works eligible for copyright. Also included as derivative work is collection of works or collection of mere data, whether in machine readable form or other form.[767] Based on the above interpretation, the data owner has the exclusive rights to control the making of the derivative works from the research data as well as adaptation of the research data which are protected as copyright.

As is the case in other countries, a data owner's exclusive rights in research data is further enhanced with the introduction of anti-circumvention provision in the *Malaysian Copyright Act* since 1997. The Act makes it an offence to tamper with the technological protection measures adopted by the copyright owners.[768] Under the Act, copyright is infringed when a person circumvents or causes any person to circumvent any effective technological protection measures that are used by authors in connection with the exercise of their exclusive rights under this Act.[769] With the introduction of this anti-circumvention provision, the copyright owner would have the right to control the viewing of electronic works on the internet which include research data which are released online. Critics in Malaysia argue that the inclusion of prohibition on anti-circumvention measures could potentially be a further intrusion into the user's activity and erosion of the larger public interest in accessing information. This is because the intention behind the circumvention is irrelevant and it could be an offence for the users to remove the encryption in order to exercise their fair dealings right.[770]

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766 *Copyright Act 1987* (Malaysia), s 3 Interpretation - adaptation.
767 Ibid ss 8(1)(a) – 8(1)(b) – derivative works.
768 Ibid s 41(1)(h) – offences.
769 Ibid s 36(3) – infringements.
770 Abdul Ghani Azmi, above n 586, 275.

The legal analysis found that data owner's have exclusive rights to control reproduction, communication, performance, distribution and adaptation of research data which are protected under the *Malaysian Copyright Act*. Data owner's exclusive rights in research data is illustrated in Table 5.2.3 below.

Table 5.2.3 Data owner's exclusive rights in research data

DATA OWNER'S EXCLUSIVE RIGHTS TO CONTROL	DESCRIPTIONS OF THE RIGHTS	THE IMPEDIMENT	
		Access	Re-use
Reproduction	Making of one or more copies of a work in any form or version. [s 13(1)(a)]		x
Communication to the public	Transmission of a work through wire or wireless means to the public in such a way that members of the public may access the work from a place and at a time individually chosen by them. [s 13(1)(aa)]	x	
Distribution	Sale or transfer of ownership of the works to the public [s 13(1)(e)]	x	
Adaptation	To convert the literary works or version of the works in its original or a different language into a dramatic work, vice versa [ss 3(1)(a) & 3(1)(b)]		x
	Translation of the literary or dramatic work		x
	Conveyance of the work wholly or mainly by means of pictures for reproduction in a book, newspapers, magazine or similar periodical		x
	Reproduction of a version of computer program in the language, code or notation in which the work was originally expressed		x
	Arrangement or transcription of musical work		x
	Conversion or a literary or artistic work or a version of the work, in its original language or a different language into a film		x
Preparation of Derivative works	Translations, adaptations, arrangements and other transformations of works eligible for copyright. [s 8(1)(a),(b)]		x
	Collection of works or collection of mere data, whether in machine readable form or other form		x

5.2.4 The Restrictive Scope of the Legitimate Use of Research Data

The scope of the legitimate use under the *Malaysian Copyright Act* is determined by the fair dealing exceptions and other permitted acts allowed under sections 13(2)(a) to 13(2)(f) of the Act. There are at least 20 permitted acts in the areas of education,

research, the media and access to information, whereby the copyright owner's right to control the works protected under the Act does not extend to these permitted acts.[771] Under the *Malaysian Copyright Act*, acts done by way of fair dealing for the purposes of private study, non-profit research, criticism, review or reporting of current events and accompanied by acknowledgements are not infringing acts.[772] Other than fair dealing exceptions, there are specific provisions for legitimate use in judicial or non-judicial legal proceedings,[773] by press and broadcasting media,[774] by government, legal, judicial as well as academic institutions.

A Malaysian intellectual property legal expert, Prof Ida Madieha Azmi points out that the scope of the legitimate use under fair dealing exceptions in Malaysia is not as broad as the fair use exemptions in the US. According to her, the concept of fair dealing in Malaysia is too narrow, as it only covers private and individual use of copyright for learning and education. Further, the *Malaysian Copyright Act* does not clarify the application of fair dealing exceptions to the digital environment. The absence of clear copyright guidelines as to how much copying is allowed creates uncertain situations for the data users. In this regards, Ida Madieha has proposed that the fair dealing provisions be expanded to the extent technologically necessary and to allow the educational institution such as universities to a right to upload works onto a server.[775]

As mentioned above, the scope of the legitimate use in the US is governed by fair use exemptions under the *US Copyright Act 1976*. Unlike fair dealing exceptions under the Malaysian *Copyright Act*, the US fair use exemptions are not restricted to specific purposes, specific types of uses or specific types of bodies or institutions. The US fair use exemptions leave the determination of fair use wide open through a

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771 Khaw Lake Tee, 'Copyright Law in Malaysia: Does the Balance Hold?' (2004) 2 *Journal of Malaysian and Comparative Law*, <http://www.commonlii.org/my/journals/JMCL/2004/2.html> (at 5 August 2011).

772 *Copyright Act 1987* (Malaysia), s 13(2)(a) – nature of copyright in literary, musical or artistic works, films and sound recordings.

773 Ibid s 13(2)(l) – nature of copyright in literary, musical or artistic works, films and sound recordings.

774 Ibid s 13(2)(n), (o) – nature of copyright in literary, musical or artistic works, films and sound recordings.

775 Abdul Ghani Azmi, above n 586, 273.

given a set of criteria as guidelines. In determining whether the use made of a work in any particular case is a fair use, the following factors need to be considered:

i) the purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes;
ii) the nature of the copyrighted work;
iii) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
iv) the effect of the use upon the potential market value for or value of the copyrighted work. [776]

While the approach could be seen as very loose and open to diverse interpretations, it is argued that the US fair use is more flexible and allows more use to be made out of the copyright work.[777] In this sense, the fair use exemptions are a general provision available to any individual or body and involves balancing factors such as the way the material is used and the effect the use will have on the market for the copyright material. As it is a general provision, new or innovative uses (including new uses), are possible under the fair use doctrine provided the circumstances of the use are 'fair'.[778] Therefore, compared to the US, it found that the scope of the legitimate use in Malaysia is more restrictive and inflexible.

Like Malaysia, the legitimate use of copyright works is provided under Australian copyright law through fair dealing exceptions. However, unlike Malaysia, the *Australian Copyright Act* provides guidelines to determine what amounts to fair dealing. Among the criteria which could be taken into account include:

i) the purpose and character of the dealing;
ii) the nature of the work or adaptation;
iii) the possibility of obtaining the work or adaptation within a reasonable time at an ordinary commercial price;
iv) the effect of the dealing upon the potential market for, or value of, the work or adaptation; and

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776 *Copyright Act 1976*, Pub L No 94-553, 90 Stat 2541 (US), s 107 Limitations on exclusive rights - fair use.

777 Academic Senate of the California State University, above n 600, 19-20.

778 A User's Guide to the Flexible Dealing Provision for Libraries, Educational Institutions and Cultural Institutions: Section 200AB of the Copyright Act 1968 (Cth).

v) in a case where part only of the work or adaptation is reproduced—the amount and substantiality of the part copied taken in relation to the whole work or adaptation. [779]

A close analysis of the *Australian Copyright Act 1968 (Australian Copyright Act)* found that it provides a broader scope of the legitimate use compared to Malaysia. Unlike the *Australian Copyright Act*, the *Malaysian Copyright Act* does not have a separate scope of the legitimate use for computer programs,[780] artistic works,[781] and audio visual items such as sound recording and cinematograph films.[782] Further analysis also found that section 40 of the *Australian Copyright Act* also clarifies the amount which is considered as reasonable portions of reproduction of the works or adaptations in determining fair dealing for the purpose of research and study. It is stated in the *Australian Copyright Act* that a reproduction of 10% of the number of words in the word or adaptation; or if the work or adaptation is divided into chapters – a single chapter, is considered as the amount that is a reasonable portion.[783]

As part of the effort to expand the scope of the legitimate use, a flexible fair dealing exception was introduced in Australia. The flexible fair dealing exception provided by section 200AB of the *Copyright Amendment Act 2006 (Cth)* allows copyright material to be used for certain socially beneficial purposes, including allowing use of copyright material for "special" purposes that benefit the broader Australian community. The requirements for using the flexible fair dealing provision are:

a) No other exceptions apply;
b) The use is for a certain purposes;
c) The use is non-commercial;
d) The use will not prejudice the copyright holder; and
e) The use is a special case. [784]

Unlike other fair dealing exceptions which only deal with a range of specific situations and uses, flexible fair dealing exceptions under section 200AB allow the

779 *Copyright Act 1968* (Australia), s 40(2) - fair dealing for purpose of research or study.
780 Ibid ss 47B – 47H - acts not constituting infringements of copyright in computer programs.
781 Ibid Part III Division 4B – acts not constituting infringements of copyright in artistic works
782 Ibid s 103A – 112E – Part IV Division VI – copyright in subject matter other than works.
783 Ibid s 40(5) - fair dealing for purpose of research or study.
784 A User's Guide to the Flexible Dealing Provision for Libraries, Educational Institutions and Cultural Institutions: Section 200AB of the Copyright Act 1968 (Cth).

use of copyright material that would not have a detrimental effect on the copyright holder and would be beneficial to society.[785] The flexible fair dealing exceptions allow among others format shifting, digitisation and adapting works to assist in the operation of archives to produce a more accessible copy of the work.[786]

Further comparison with the scope of the legitimate use under the *UK Copyright, Designs and Patents Act 1988* (CDPA) found that the CDPA permits a person who has a right to use the database or any part of the database, to do, in the exercise of that right, anything which is necessary for the purpose of access to and use of the contents of the database or of that part of the database.[787] The CDPA also allows, in the absence of a certified licensing scheme, the act of copying the abstract of an article on a published scientific or technical subject or to issue the copies of the abstract to the public.[788] The CDPA also contains a specific provision which permits the lawful user of a copy of a computer program who wants to determine the ideas, principles and elements underlying the computer the program to perform the acts of loading, displaying, running, transmitting or storing the program which he is entitled to do.[789]

Further, the CDPA provides a specific section which permits the visually impaired person, to make an accessible copy of a literary (except a database), dramatic, musical and artistic (except where the musical work or part of musical work contains recorded performance) work or a published edition of a work, earlier inaccessible to the person because of the person's visual impairment.[790] The only limitation to this section is where copies of the copyright work which is accessible to that person is commercially available.[791] This section is important as it allows the research data to be adapted into a format accessible to a visually impaired data user. All the above provisions in the CDPA, provide a broader scope of the legitimate use compared to fair dealing exceptions under the *Malaysian Copyright Act*.

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785 Ibid.
786 Ibid.
787 *Copyright, Designs and Patents Act 1988*, c 48 (Eng.), s 50D(1) – acts permitted in relation to databases.
788 Ibid ss 60(1), (2) – abstracts of scientific or technical articles.
789 Ibid s 50BA(1) – observing, studying and testing of computer programs.
790 Ibid s 31A – making a single accessible copy for personal use.
791 Ibid s 31A(3) – making a single accessible copy for personal use.

The legal analysis found that, the scope of the legitimate use under the *Malaysian Copyright Act* is very restrictive compared to the UK, US and Australia. The restrictive scope of the legitimate use in Malaysia is illustrated in Table 5.2.4 below.

Table 5.2.4 The restrictive scope of the legitimate use of research data

THE SCOPE OF THE LEGITIMATE USE UNDER SECTION 13(2)(a) OF THE MALAYSIAN COPYRIGHT ACT	THE RESTRICTIVE SCOPE OF THE LEGITIMATE USE
The exclusive right of control under the *Malaysian Copyright Act* does not include the right to control the doing of any of the acts by way of fair dealing for purposes of non-profit research, private study, criticism, review or the reporting of current events, subject to the condition that if such use is public, it is accompanied by an acknowledgement of the title of the work and its authorship, except where the work is in connection with the doing of any of such acts for the purposes of non-profit research, private study and the reporting of current events by means of a sound recording, film or broadcast.	The fair dealing exceptions under the *Malaysian Copyright Act*, is restricted to specific purposes, specific types of uses or specific types of bodies or institutions. Fair dealing exceptions under the *Malaysian Copyright Act* do not provide: i) a set of criteria as guidelines to determine fair use; ii) a clear guidelines as to how much reproduction is allowed under fair dealing exceptions; iii) flexible fair dealing exceptions which allows the use of the copyright material that would be beneficial to society; and iv) a provision which permits a person who has a right to use the database or any part of the database, to do, in the exercise of that right, anything which is necessary for the purpose of access to and use of the contents of the database or of that part of the database.

5.2.5 Complex and Lengthy Licensing Procedures for Research Data

The *Malaysian Copyright Act* defines "licence" as a lawfully granted licence in writing, permitting the doing of an act controlled by copyright.[792] Under the *Malaysian Copyright Act*, copyright is infringed by any person who does or causes any other person to do, without the licence of the owner of the copyright, an act the doing of which is controlled by copyright under this Act.[793] The power to grant licence and to impose the conditions of access and re-use in the copyright works, is vested in the owner of copyright whose consent is required so that the research data which is protected as copyright materials could be reproduced, communicated or distributed by the third party.[794] The ownership of intellectual property rights such as copyright of research data is transferable by way of assignment of copyright,

792 *Copyright Act 1987* (Malaysia), s 3 Interpretation – licence.

793 Ibid s 36(1) Remedies for Infringements and Offences - infringements.

794 Ibid s 13(1) – nature of copyright in literary, musical or artistic works, films and sound recordings.

copyright licensing or testamentary disposition.[795] An assignment, licence or testamentary disposition could also be granted in respect of a future work or an existing work in which copyright does not yet subsist.[796]

To standardise the licensing procedures, the *Malaysian Copyright Act* allows the establishment of a licensing body to operate licensing schemes in relation to copyright in literary, musical or in any other works, relating to reproducing/making copies of the work; performing, showing or playing the work in public; communicating the work to the public; or distributing the work to the public.[797] Under the *Malaysian Copyright Act*, "licensing scheme" means a scheme whether described as a scheme or by any other name setting out the classes of case in which the operator of a scheme, or the person on whose behalf he acts, is willing to grant copyright licenses and the terms on which licenses would be granted in those classes of case.[798]

Besides the licensing scheme referred to above, a separate licence can also be issued by the licensing body which authorises reproduction; performance, showing or playing in public; communicating the work to the public; or distributing the literary, musical or other works to the public.[799] Despite the existence of such provisions, there is no copyright licensing body or copyright licensing scheme for research data in Malaysia. In the absence of such a licensing body or licensing scheme, access to and re-use of publicly funded research data in Malaysian public universities is subject to separate negotiations between data owner and data users. The separate negotiations may end up with different licensing conditions for access to and re-use of the research data.

In negotiating the rights to access and re-use of the research data which are protected under copyright law, the *Malaysian Copyright Act* allows the data owner to limit the assignment so as to apply only to some of the acts which the owner of the copyright has the exclusive right to control, or to only part of the period of the copyright, or to

795 Ibid s 27(1) – assignment, licenses and testamentary disposition.
796 Ibid s 27(6) – assignment, licenses and testamentary disposition.
797 Ibid ss 27A(a) & 27A(b) – licensing schemes to which Sections 27B to 27G Apply.
798 Ibid s 3 Interpretation - licensing scheme.
799 Ibid s 27H(a) & 27H(b) – licenses to which sections 27I to 27L apply.

a specified country or other geographical area.[800] The Act also provides that no assignment of copyright and no licence to do an act the doing of which is controlled by copyright shall have effect unless it is in writing.[801] The owner's legal rights to limit the application of the license and the legal requirement for the license to be in writing add up to the already complex and lengthy process in negotiating the rights to access and re-use publicly funded research data which are protected under copyright law.

The legal analysis found that, licensing publicly funded research data in Malaysia is complex and lengthy, as it is in other countries. The complex and lengthy licensing procedures for research data in Malaysia is illustrated in Table 5.2.5 below.

Table 5.2.5 Complex and lengthy licensing procedures for research data

LEGAL REQUIREMENTS IN COPYRIGHT LICENSING	COMPLEX AND LENGTHY LICENSING PROCEDURES ARISING FROM IT
License is required from copyright owner to do an act the doing of which is controlled by copyright under this Act. [s 36(1)]	The rights to access and re-use to each and every copyright protected publicly funded research data in Malaysian public universities is subject to consent from the copyright owner.
The copyright owner may limit the scope of licence to apply only to some acts which the owner has the exclusive right to control. [s 27(2)]	The data user needs to negotiate with copyright owner in order to be granted the rights to a single, a combination or all of the following exclusive rights: i. Reproduction in any material form; ii. Communication to the public; iii. Performance, showing or playing to the public; iv. The distribution of copies to the public; and v. The commercial rental to the public.
The copyright owner may limit the licence to apply to only part of the period of the copyright. [s 27(2)]	The data owner has the option to determine the duration of licence either to cover the entire copyright protection period or a fraction of it.
The copyright owner may limit the licence to apply to a specified country or other geographical area. [s 27(2)]	The data owner has the option to discriminate the data users based on their country or their locality.
Copyright licence shall have no effect unless made in writing. [s 27(3)]	All licences pertaining to the rights to access and re-use publicly funded research data in Malaysian public universities must be recorded in writing.

800 Ibid s 27(2) – assignment, licenses and testamentary disposition.
801 Ibid s 27(3) – assignment, licences and testamentary disposition.

5.2.6 Author's Moral Right of Integrity

Under the *Malaysian Copyright Act*, an author's moral rights exist in every work in which copyright subsists, which are literary, artistic and musical works, films, sound recordings, broadcasts and published editions of literary, artistic and musical works.[802] The *Malaysian Copyright Act* vests in the author or the personal representative of the author, upon his/her death, a moral right which is distinct from the exclusive rights of the owner.[803] The moral rights may be exercised notwithstanding that the ownership of copyright in the work is not vested in the author or his personal representative.[804]

As far as the moral right of integrity is concerned, the *Malaysian Copyright Act* provides that, where copyright subsists in a work, no person may, without the consent of the author or his personal representative after the author's death, do or authorise the distortion, mutilation or modification of the work if the distortion, mutilation or modification significantly alters the work and is such that it might reasonably be regarded as adversely affecting the author's honour or reputation.[805] Based on the above provision, it is found that author's moral right of integrity under Sec 25(2) is the right to prevent and as a corollary, to authorise the presentation of the work to be distorted, mutilated or modified.[806]

Where there is any use of research data which infringes the author's moral right of integrity, the researcher, or upon the researcher's death his personal representative, is empowered under Sec 25(4) of the *Malaysian Copyright Act*, to commence a legal action for breach of statutory duty to recover damages or to obtain injunctive relief and such other remedy as may be available. Further, under Sec 25(7), the court may also direct the publication of such correction as it may deem fit to restore the author's honour or reputation or to attribute to the author such authorship as had been falsely or wrongly attributed.[807]

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802 Khaw Lake Tee, 'The Author's Moral Rights Under The Malaysian Copyright Law' (1994) 1 *Malayan Law Journal* cxxv.

803 *Copyright Act 1987* (Malaysia), s 25(2)(a) - moral rights

804 Ibid s 25(4) - moral rights

805 Ibid ss 25(2)(b)(i), (ii) – moral rights.

806 Khaw, above n 802, cxxv.

807 Wang, above n 599, 88.

It is therefore found that an author's moral right of integrity is also being protected in Malaysia. However, compared to an author's moral right of integrity under the *Australian Copyright Amendment (Moral Rights) Act 2000*, the *Malaysian Copyright Act* does not provide an exception to an author's moral right of integrity. Under the *Australian Copyright Amendment Act*, an author's right of integrity does not apply to sound recording as it is only applicable to literary, dramatic, musical, artistic, and cinematography works.[808] The *Australian Copyright Amendment Act* also provides the reasonableness defence, whereby under the law, it is not an infringement of right of integrity of authorship if the person who was alleged to infringe establishes that it was reasonable in all the circumstances to subject the work to such treatment.[809]

Under the *Australian Copyright Amendment Act*, the matters which shall be taken into account in determining the reasonableness of the action include among others: the nature of the work; the purpose for which the work is used; the manner in which the work is used; the context in which the work is used; any practice, in the industry in which the work is used, that is relevant to the work or the use of the work; and whether the work was made in the course of author's employment; or under a contract for the performance by the author of services for another person.[810] Similar defence is missing from the *Malaysian Copyright Act*.

Further, unlike the law in Australia, the *Malaysian Copyright Act* does not provide for consent or waiver of moral rights by authors of copyright works.[811] The *Australian Copyright Act* has a specific provision which allows the author of a literary, dramatic, musical or artistic work to give consent for act or omission by the third party.[812] The *Australian Copyright Act* states that it is not an infringement of a moral right of an author in respect of a work to do, or omit to do, something if the act

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808 *Copyright Amendment (Moral Rights) Act 2000* (Commonwealth Australia), ss 195AJ, 195AK, 195AL - Division 4: right of integrity of authorship of a work.

809 Ibid ss 195AS(1), 195AS(4) - no infringement of right of integrity of authorship if derogatory treatment or other action was reasonable.

810 Ibid s 195AS(2) - no infringement of right of integrity of authorship if derogatory treatment or other action was reasonable.

811 At the same time, the *Malaysian Copyright Act* also does not contain any express provision which prevents or prohibits waiver of author's moral rights.

812 *Copyright Act 1968* (Australia), s 195AWA(1) – Author's consent to act or omission: work that is not film or included in a film.

or omission is within the scope of a written consent genuinely given by the author or a person representing the author.[813]

Similar to the *Australian Copyright Act*, the CDPA also includes a specific provision that allows authors to validly consent to any act which infringes their moral rights. It also empowers the authors to fully waive their moral rights in advance with a signed written agreement.[814] In addition, the scope of an author's moral rights under the CDPA is not as broad as the scope of protection under the *Malaysian Copyright Act*. An author's moral right of integrity under the CDPA does not apply to computer programs or to any computer generated works.[815] An author's moral right of integrity under the CDPA also does not apply in relation to the publication in a newspaper, magazine or similar periodical, or an encyclopaedia, dictionary, yearbook or other collective work of reference, of a literary, dramatic, musical or artistic work made for the purposes of such publication or made available with the consent of the author for the purposes of such publication. Further, an author's moral right of integrity under the CDPA does not apply to anything done in relation to works in which copyright originally vested in the author's employer by virtue of works produced in course of employment.[816] Finally, an author's moral right of integrity also does not apply in the UK to works in which Crown copyright subsists.[817] As a result of a number of exclusions under the CDPA, publicly funded research data created by university researchers in the UK is unlikely to be subjected to an author's moral rights of integrity.

Further comparison with authors' moral rights in the US found that, unlike Malaysia, an author's moral right of integrity does not apply to all authors, but is only applicable to certain authors of the specified group of works.[818] The US introduced the *Visual Artists Rights Act 1990* (VARA), a specific legislation to regulate authors' moral right of integrity. Under VARA, authors' moral right of integrity apply only

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813 Ibid s 195AWA(2) – Author's consent to act or omission: work that is not film or included in a film.

814 *Copyright, Designs and Patents Act 1988*, c 48 (Eng), ss 87(1), 87(2), 87(3) - consent and waiver of rights.

815 Ibid s 81(2) - exceptions to right.

816 Ibid s 82(1)(a) - qualification of right in certain cases.

817 Ibid s 82(1)(b) - qualification of right in certain cases.

818 See *Copyright Act 1976*, Pub L No 94-553, 90 Stat 2541 (US), s 106A – rights of certain authors to attribution and integrity.

to works of visual art, defined as paintings, drawings, prints, photographs produced for exhibition purposes or sculptures.[819] VARA expressly excludes any poster, map, globe, chart, technical drawing, diagram, model, applied art, motion picture or other audiovisual work, book, magazine, newspaper, periodical, data base, electronic information service, electronic publication or similar publication, any work made for hire and any work not subject to copyright protection from its scope of protection.[820] With such a broad exclusion, a large category of research data is not protected by authors' moral rights of integrity under VARA.

Like the *Australian Copyright Act* and the CDPA, VARA also allows waivers of moral rights of integrity, provided they are undertaken in a written instrument signed by the author.[821] The waiver instrument shall specifically identify the work and uses of that work to which the waiver applies. The waiver shall apply only to the work and uses so identified. Unlike the CDPA which provides that a waiver of moral rights by one joint author does not affect the rights of the other joint authors,[822] VARA expressly declares that, in the case of a joint work prepared by two or more authors, a waiver of rights under this paragraph made by one author waives such rights for all other authors.[823]

The legal analysis found that authors' moral right of integrity which exists in Malaysia is much broader, less flexible, more rigid and less clear when compared to Australian, the UK and the US laws. The legal impediment arising from author's moral right of integrity under the *Malaysian Copyright Act* is illustrated in Table 5.2.6 below:

Table 5.2.6 Author's moral right of integrity

FINDINGS	REMARKS	THE IMPEDIMENT
The broad scope of protection	The right covers all categories of works protected under copyright law. No express exceptions to the scope of	Consent is required by the users before transformative use could be made to all types of research data for fear that

819 *Visual Artists Rights Act of 1990*, Pub L 101−650, Dec 1, 1990, 104 Stat 5128 (US), ss 101(1), 101(2) – work of visual art defined.

820 Ibid ss 102(A)(1), 102(B), 102(C) - work of visual art defined.

821 Ibid s 106(A)(e)(1) – transfer and waiver.

822 *Copyright, Designs and Patents Act 1988*, c. 48 (Eng.) – Sec. 88(3) - application of provisions to joint works.

823 *Visual Artists Rights Act of 1990*, Pub L 101−650, Dec 1, 1990, 104 Stat 5128 (US), s 106(A)(e)(1) – transfer and waiver.

	protection is provided, unlike in Australia, the UK and the US.	the use may violate the author's moral right of integrity.
The inflexibility of the protection	Unlike the UK and the US, the Malaysian Copyright Act has no express provision for waiver of moral rights in advance.	The university or public research funder lacks statutory power to compel data creators to waive their moral right of integrity in publicly funded research data.
The rigidity of the protection	Unlike Australia which provides reasonableness defence, no specific defence is available under the Malaysian Copyright Act.	It does not provide a way out to the user who is subject to infringement proceedings for alleged violation of the author's moral right of integrity.
Lack of clarity in the terms and the test to be used	Unlike Australia which provides the test of reasonableness to determine whether there is an infringement of author's moral right, it is not clear from whose perspective the infringement of the author's moral right of integrity is to be tested.	It left the users in a state of uncertainty whether their act amounts to infringement of the author's moral right of integrity.

5.2.7 Non-Disclosure Duty of Confidential Research Data

While there is no statutory definition of confidential information in Malaysia, the judge in the case of *Electro CAD Australia Pty Ltd & Ors v Mejati RCS Sdn Bhd & Ors*, defines confidential information as information which is the object of an obligation of confidence and has a confidential character. According to the judge, among the information which has confidential character are trade secrets, literary and artistic secrets, personal secrets and public and government secrets.[824]

A non-disclosure duty of confidential research data applies to both raw data and information. In the case of *Schmidt Scientific Sdn Bhd v Ong Han Suan & Ors*,[825] it was held that, even though the information was merely a 'configuration' of data supplied by the manufacturers for the purpose of arriving at the selling price, what made it confidential was the compilation of lists of the names and addresses of customers and their budget and the costs and prices of the equipment obtained from the overseas principal/supplier.[826]

824 *Electro CAD Australia Pty Ltd & Ors v Mejati RCS Sdn Bhd & Ors* [1998] 3 MLJ 422 at 441.
825 *Schmidt Scientific Sdn Bhd v Ong Han Suan & Ors* [1998] 1 CLJ 685.
826 *Schmidt Scientific Sdn Bhd v Ong Han Suan & Ors* [1997] 5 MLJ 632.

Where the non-disclosure duty is formalised as a contract there is a contractual duty on the part of the researcher not to disclose to the third party the confidential information which becomes the subject matter of the contracts. The *Malaysian Contracts Act 1950* provides that the parties to a contract must perform their contractual duty, unless the performance is dispensed with or excused under the Act, or of any other law.[827] Besides the contractual duty, the non-disclosure duty is also governed under English common law which is applicable in Malaysia.

In the case of *World Wide Rota Dies Sdn Bhd*, Abdul Malik Ishak J citing the principles of English common law, held that:

> A duty of non-disclosure arises when confidential information comes to the knowledge of a person (the confidant) in circumstances where he has notice or is held to have agreed, that the information is confidential, with the effect that it would be just in all the circumstances that he should be precluded from disclosing the information to others. [828]

In the case of *Dato' Vijay Kumar Natarajan v Choy Kok Mun*, it was held that the obligation to confidentiality is both expressed and implied and could arise even in the absence of contract.

The Judge in the Dato' Vijay Kumar case, Mohd Hishamudin J, in his judgement, has applied the Common Law principles derived from the English case of *Duchess of Argyll v Duke of Argyll* [1967] Ch 302 at page 304:

> A contract or obligation of confidence need not be expressed, but could be implied, and a breach of contract or trust or faith could arise independently of any right of property or contract (other than any contract which the imparting of the confidence might itself create); and that the court, in the exercise of its equitable jurisdiction, would restrain a breach of confidence independently of any right at law.[829]

Further, Mohd Hishamuddin J, in the same case also cites the English case of *Coco v A N Clark (Engineers) Ltd* [1969] RPC 41, whereby Megarry J identifies three essential elements to establish the duty of non-disclosure in the absence of contract:

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827 *Contracts Act 1950* (Malaysia), ss 38(1), 38(2) – obligation of parties to contracts.

828 See also, *AG v Guardian Newspapers* (No 2) (HL (E) [1990] 1 AC 109.

829 *Dato' Vijay Kumar Natarajan v Choy Kok Mun* (2009) MLJU 0827.

> Three elements are normally required if, apart from contract, a case of breach of confidence is to succeed. First, the information itself, in the words of Lord Greene M. R. in Saltman case [(1948) 65 R. P. C. 203, 215] must 'have the necessary quality of confidence about it'. Secondly, that information must have been imparted in circumstances importing an obligation of confidence. Thirdly, there must be an unauthorised use of that information to the detriment of the party communicating it. [830]

The fact that the obligation of confidence could be both expressed and implied, with or without contract, strongly suggests that a promise of confidentiality given by the researchers either verbally or written on the consent form, interview script, survey form, recruitment letter, brochure etc, could also give rise to a non-disclosure duty. Based on the above judgments, it is clear that, in the absence of contractual duty, non-disclosure duty of research data which is subject to a promise of confidentiality is governed by the law of tort. Under the law of tort, an action for breach of confidence will lie where there is a disclosure of information which breaches an obligation of confidence.[831] In the Schmidt case, the Court held that a breach of confidence should be regarded as a tort with damages to be awarded to the successful plaintiff.[832]

Besides the law of tort, a Malaysian legal scholar who writes on confidential information law in Malaysia states that the law of equity provides a basis for the court's intervention where confidential disclosure is not founded on a contractual relationship.[833] According to the scholar, it is an equitable principle that those who received information in confidence should not disclose them to others or take advantage of the information received to the detriment of the owner of the information.[834] The scholar's opinion is in line with the decision in Dato' Vijay Kumar case, which rules that the legal duty not to disclose information in the absence of contract, is also founded on a broad equitable obligation of conscience.[835]

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830 Ibid.

831 *Electro CAD Australia Pty Ltd & Ors v Mejati RCS Sdn Bhd & Ors* [1998] 3 MLJ 422 at 441.

832 *Schmidt Scientific Sdn Bhd v Ong Han Suan & Ors* [1998] 1 CLJ 685.

833 Juriah Abdul Jalil, *Confidential Information Law in Malaysia: Cases and Commentaries* (Sweet & Maxwell Asia, Kuala Lumpur, 2003) 76.

834 Ibid 70.

835 *Dato' Vijay Kumar Natarajan v Choy Kok Mun* (2009) MLJU 0827 at 0828

The legal analysis found that, there is a non-disclosure duty of confidential research data in Malaysia. The duty is illustrated in Table 5.2.7 below.

Table 5.2.7 Non-disclosure duty of confidential research data

SOURCE OF DUTY	THE GOVERNING LAW	THE RESEARCH DATA NOT TO BE DISCLOSED	NATURE OF BREACH OF DUTY
Duty of non-disclosure arising from contracts	*Malaysian Contracts Act 1950*	The research data which becomes the subject matter of a contract	Breach of contract
Duty of non-disclosure arising from English Common Law	The law of tort	The research data which was collected under promise of confidentiality	Breach of confidence
	The law of equity	The research data which was imparted to the researchers under expectation of confidence and secrecy	Breach of equitable obligation of conscience

5.2.8 The Right To Informational Privacy of Subjects Of Research Data

The statutory protection of the right to informational privacy in Malaysia under the *Personal Data Protection Act 2010* only applies to any person who processes and has control over or authorises the processing of any personal data in respect of commercial transactions.[836] "Commercial transactions" under the Act means any transaction of a commercial nature, whether contractual or not, which includes any matters relating to the supply or exchange of goods or services, agency, investments, financing, banking and insurance. As the Act only applies to personal data in respect of commercial transactions, the protection of the right to informational privacy under the Act is very limited and is not broad enough to protect personal data collected from non-commercial transactions such as from university research. Hence, the right to informational privacy of subjects of research data is not protected under the *Malaysian Data Protection Act*.

The *Malaysian Communications and Multimedia Act 1998* to certain extent protects the right to informational privacy of subjects of research data. Under the Act, "communications" includes communication, whether between persons and persons, things and things or persons and things, in the form of sound, data, text, visual

836 *Personal Data Protection Act 2010* (Malaysia), s 2 – application.

images, signals or any other form or any combination of those forms.[837] The Act states that, no content applications service provider or other person using a content applications service, shall provide content which is indecent, obscene, false, menacing or offensive in character with intent to annoy, abuse, threaten or harass any person.[838]

Under the *Malaysian Communications and Multimedia Act 1998,* the "application service provider" is defined as a person who provides an applications service,[839] while "content applications service" means application service which provides content.[840] The content in the application service according to the Act may include sound, text, still picture, moving picture or other audio visual representation or any combination of the contents which is capable of being created, manipulated, stored, retrieved or communicated electronically.[841] Based on the above provisions, the researchers who use the content application service to release the research data and the repository centre as the online application service provider are under the obligation not to release any research data in the form of sound, text or images which is indecent, obscene, false, menacing or offensive in character.

The *Malaysian Communications and Multimedia Code* which was prepared and drawn pursuant to the Act, contains the obligations of content applications service providers and persons using a content applications service who disseminates their contents to the public (hereinafter referred as "Content Provider").[842] The Code's Guidelines on Contents require as a matter of principle for the content provider to ensure to the best of their ability, that their content contains no abusive or discriminatory material or comment on matters of, but not limited to, race, religion, culture, ethnicity, national origin, gender, age, marital status, socio economic status, political persuasion, educational background, geographic location, sexual orientation or physical or mental ability, acknowledging that every person has a right to full and equal recognition and to enjoy certain fundamental rights and freedoms as contained

837 Communications and Multimedia Act 1998 (Malaysia).
838 Ibid s 211(1) – prohibition on provision of offensive content.
839 Ibid s 6 Interpretation – applications service provider.
840 Ibid s 6 Interpretation – content applications service provider.
841 Ibid s 6 Interpretation – content.
842 Malaysian Communications and Multimedia Code, foreword, [(b)] – [(c)].

in the *Federal Constitution* and other relevant statutes.[843] This provision protects the right to informational privacy of subjects of research data as it prohibits online content providers from disseminating abusive or discriminatory content to the public.

The right to privacy is also recognised by the Federal Court, which is the Malaysian apex court, in the case of *Sivarasa Rasiah v Badan Peguam Malaysia & Anor*. The Federal Court declares that the protection of personal liberty, which is guaranteed as a fundamental right under Art 5(1) of the *Malaysian Federal Constitution*, includes the right to privacy. According to Gopal Sri Ram FCJ (as then he was), it is patently clear from a review of the authorities that "personal liberty" in Art 5(1) encompassed other rights such as the right to privacy.[844] Based on the Court declaration, the right to privacy is protected as constitutional rights in Malaysia.

Two other decisions made by the Malaysian Courts held that invasion of privacy is an actionable tort in Malaysia. In the case of *Maslinda Ishak v Mohd Tahir Osman & Ors*,[845] the Court of Appeal accepts the invasion of privacy of a female in relation to her modesty, decency and dignity to be a cause of action and thus actionable under the law of tort. Later, in the case of *Lee Ewe Poh v Dr Lim Teik Man & Anor*,[846] there was an unauthorised disclosure, of a photograph which contained the Plaintiff's private parts, by the Plaintiff's doctor to a third party. The judge held that an invasion of privacy occurs, which according to him is an actionable tort. The judgment further states that even if the court were to err in the view that invasion of privacy rights was actionable tort under the common law, the plaintiff could still come within the cause of action of breach of trust or confidence, as the Defendant was under obligation to maintain confidence of that information.[847] Hence, in light of the most recent judicial recognition of the right to privacy under the Lee case, it could be inferred that unauthorised use and disclosure of personal information may also be protected as a violation of privacy.

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843 Ibid [2.9] Part 1 Introduction – general principles.
844 *Sivarasa Rasiah v Badan Peguam Malaysia & Anor* [2010] 3 CLJ 507 at 519.
845 *Maslinda Ishak v Mohd Tahir Osman & Ors* [2009] 6 CLJ 653.
846 *Lee Ewe Poh v Dr Lim Teik Man & Anor* [2011] 4 CLJ 397.
847 Ibid 388, 389.

The legal analysis found that, the right to informational privacy of subjects of research data is protected under the Malaysian law. The right to informational privacy of subjects of research data in Malaysia is illustrated in Table 5.2.8 below.

Table 5.2.8 The right to informational privacy of subjects of research data

THE LAW	THE PRIVACY RIGHT UNDER THE LAW	THE PROTECTION GIVEN TO SUBJECT OF RESEARCH DATA
Malaysian Communications and Multimedia Act 1998	The statutory rights against content applications service provider, or other person using a content applications service who provide content which is indecent, obscene, false, menacing, or offensive in character.	Protection from disclosure of research data which contains abusive or discriminatory material or comment on matters pertaining to, but not limited to, race, religion, culture, ethnicity, national origin, gender, age, marital status, socio economic status, political persuasion, educational background, geographic location, sexual orientation or physical or mental ability.
The Federal Court in *Sivarasa Rasiah v Badan Peguam Malaysia & Anor*	Constitutional right to privacy is guaranteed as part of fundamental right of liberty under Art 5(1) of Federal Constitution of Malaysia.	Protection from unauthorised use and disclosure of personal information contains in research data which invades individual privacy.
The Court of Appeal in *Maslinda Ishak v Mohd Tahir Osman & Ors*	The common law rights actionable under the law of tort against invasion of privacy in relation to modesty, decency and dignity of a person	Protection from disclosure and use of personal information contains in research data which violates the modesty, decency and dignity of data subject.
The High Court of Malaya in *Lee Ewe Poh v Dr Lim Teik Man & Anor*	The common law rights actionable as breach of trust or confidence for unauthorised disclosure of personal information to the third party	Protection from unauthorised use and disclosure of personal information including those contain in research data.

5.2.9 Protection of National Security

In Malaysia, freedom of speech and expression, which are the umbrella provisions for the public's right to seek, receive and impart information and ideas, are subject to constitutional limitation.[848] Art 10(2) of the *Malaysian Federal Constitution* qualify the freedom of speech and expression in the following terms:

[848] See Art. 19, 'The Universal Declaration of Human Rights', above n 676; Art. 19, 'International Covenant on Civil and Political Rights', above n 676.

> Parliament may by law impose such restrictions as it deems necessary or expedient in the interest of the security of the Federation or any part thereof, friendly relations with other countries, public order or morality and restrictions designed to protect the privileges of Parliament or of any Legislative Assembly or to provide against contempt of court, defamation or incitement to any offence.

Pursuant to the constitutional limitation, several laws have been passed in Malaysia which protect national security by restricting disclosure of research data which is classified as prejudicial to national security. At the forefront is the *Internal Security Act 1960* (hereinafter known as the "ISA") which governs the internal security of Malaysia. Under the ISA, besides the general prohibition of publications and circulation of any document which is prejudicial to the national interest, public order or security of Malaysia,[849] there are specific prohibitions to publish any document which contains any incitement to violence, counsels disobedience to the law or to any lawful order, which could likely lead to a breach of the peace or to promote feelings of hostility between different races or classes of the population.[850]

Another law that protects national security by restricting disclosure of research data which is classified as prejudicial to national security, is the *Official Secrets Act* (hereinafter known as "the OSA"). Under the OSA the information which is prohibited from being disclosed to the public on the basis of national security is document which contains information pertaining to prohibited place and munitions of war, apparatus, equipment, and machinery which are used in the maintenance of the safety and security of Malaysia should not be published for public access and re-use.[851] Under the OSA, besides a document in writing, the term "document" includes: any map, plan, model, graph or drawing; any photograph; any disc, tape, sound track or other device in which sound or other data (not being visual images) are embodied so as to be capable of being reproduced therefrom; and any film,

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849 See *Internal Security Act 1960* (Malaysia), s 22(1)(d) – prohibition of printing, sale, etc., of documents and publications. The ISA has been repealed and replaced with the *Security Offences (Special Measures) Act 2012* as of July 2012.

850 Ibid s 22(1)(a)-(c) – prohibition of printing, sale, etc, of documents and publications.

851 *Official Secrets Act 1972* (Malaysia), s 7A(1)(a) - (b) – duty to report request for information, etc.

negative, tape or other device in which one or more visual images are embodied so as to be capable of being reproduced therefrom.[852]

The *Communications and Multimedia Act 1998* through the *Malaysian Communications and Multimedia Code* (hereinafter known as "the Code") also restricts disclosure of research data which is classified as prejudicial to national security. Under the Code, information which may be a threat to national security or public health and safety should not be presented by the content provider for the purpose of dissemination.[853] Under the Code, information which could be a threat to national security, public health or safety are:

i. Making available instructions and guidance on bomb-making, illegal drug production or counterfeit products;
ii. Disseminating false information with regards to outbreak of racial disturbances in a specific part of the country;
iii. Circulating information and statements with regards to possible terrorist attacks; and
iv. Circulating or making available information with regards to the outbreak of a deadly or contagious diseases. [854]

Disclosure of research data which is classified as prejudicial to national security is also restricted under the *Printing Presses and Publications Act 1984* (the PPP Act). The PPP Act regulates the production, reproduction, publishing and distribution of publications to the public. Under the PPP Act, "publication" includes not only a document, newspaper, book and periodical, all written or printed material and audio recording, but also includes anything which by its form, shape or in any manner is capable of suggesting words or ideas.[855] Based on the broad interpretation given by the PPP Act, it could be inferred that information contained in research data which is released online could amount to publication under the Act.

852 Ibid s 2 Interpretation – document.
853 *The Malaysian Communications and Multimedia Code*, [5.0], Part 2, Guidelines on Content - Menacing Content.
854 Ibid.
855 *Printing Presses and Publications Act 1984*, s 2- Interpretation

It is provided in the PPP Act that, if the Minister is satisfied that any publication contains any article, caricature, photograph, report, notes, writing, sound, music, statement or any other thing:

i) which is in any manner prejudicial to or likely to be prejudicial to public order, morality, security; or

ii) which is likely to alarm public opinion, or which is or is likely to be contrary to any law or is otherwise prejudicial to or is likely to be prejudicial to public interest or national interest -

the Minister may in his absolute discretion by order published in the *Gazette* prohibit, either absolutely or subject to such conditions as may be prescribed, the printing, importation, production, reproduction, publishing, sale, issue, circulation, distribution or possession of that publication and future publications of the publisher concerned.[856]

The PPP Act, in allowing the Minister to prohibit publication which is prejudicial to public security, does not provide a proper guidelines to the Minister, but instead has left the matter to the Minister to decide. The Act also does not define the term "security", leaving a broad discretion to the Minister.

The legal interpretation of what type of information could be classified as prejudicial to the national security under the PPP Act is found in several case laws in Malaysia. In giving a judicial interpretation of what amounts to "national security", Heliliah J in her written judgment in the High Court case of *Ahmad Yani Bin Ismail & Anor v Inspector General of Police & Ors* states that:

> What matters of national interest are infinitely varied. So are matters of national security of the State. These are the concerns of the minister. In the exercise of his discretion, he need not necessarily have to consider and rely on police investigation. This is implicit in the very nature of an unfettered discretion. There may well be other public considerations of a political, social or economic nature having an impact on national security which are purely within his peculiar knowledge and which he considers relevant to his decision.[857]

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856 Ibid s 7(1) – Undesirable Publications.

857 *Ahmad Yani Bin Ismail & Anor v Inspector General of Police & Ors* [2005] 4 MLJ 636.

Another decision by the Federal Court in the case of *BA Rao & others v Sapuran Kaur & Anor* classifies documents relating to affairs of state as part of national security interests. In his judgment, his Lordship Raja Azlan Shah FJ (as he then was) rules:

> Where there is a danger that disclosure will divulge, say, State secrets in military and international affairs or Cabinet documents, or departmental policy documents, private interest must give way. It is for the court, not the executive, ultimately to determine that there is a real basis for the claim that "affairs of State is involved", before it permits non-disclosure. While it is clear that the final decision in all circumstances rests with the court, and that the court is entitled to look at the evidence before reaching a concluded view, it can be expected that categories of information will develop from time to time. It is for that reason that the legislature has refrained from defining "affairs of State." In my opinion, "affairs of State", like an elephant, is perhaps easier to recognise than to define, and their existence must depend on the particular facts of each case. [858]

In the case of *Arumugam a/l Kalimuthu v Menteri Keselamatan Dalam Negeri & Ors*, the applicant filed for judicial review against the banning of a book in the Tamil language which contains ten accounts by the victims of the racial disturbance in one village in Malaysia. The applicant, as the author of the book, sought a declaratory order that the Minister's order was invalid and null and void. It was held by the Court that the book, which was written based on a racial disturbance that occured in one village in Malaysia, was a public order and national security issue in itself. Despite the fact that major parts of the book were derived from a PhD thesis, the book is meant for general consumption, and targeted to the Indian community who were portrayed in the book as the victims.[859]

The legal analysis found that there are various laws in Malaysia which restricts disclosure of information classified as prejudicial to the national security. The protection of national security under the Malaysian laws is illustrated in Table 5.2.9 below.

858 *BA Rao & Others v Sapuran Kaur & Anor* (1978) 2 MLJ 146.
859 *Arumugam a/l Kalimuthu v Menteri Keselamatan Dalam Negeri & Ors* [2010] 3 MLJ 412.

Table 5.2.9 Protection of national security

THE LEGAL PROTECTION	IMPOSED ON	THE RESTRICTIONS
The Internal Security Act 1960	The general public in Malaysia	General prohibition of publications and circulation of any document which is prejudicial to the national interest, public order or security of Malaysia Specific prohibition of publication any document which contains any incitement to violence; counsels disobedience to the law or to any lawful order; which could likely lead to a breach of the peace or to promote feelings of hostility between different races or classes of the population.
The Official Secrets Act 1972	Any person having in his/her possession or control any official secret	Prohibited from disclosing document which contains information pertaining to prohibited place, and munitions of war, apparatus, equipment, and machinery which are used in the maintenance of the safety and security of Malaysia.
The Malaysian Communications and Multimedia Act 1998	The Content Provider i.e. researcher, data repository centre, university	Dissemination of content that: i) offends good taste or decency; ii) is offensive to public feeling; iii) is likely to encourage crime or lead to disorder, or is abusive or threatening in nature; iv) cause annoyance; v) encourages or incites crime; vi) leads to public disorder; vii) may be a threat to national security, public health and safety.
Printing Presses and Publications Act 1984	Any person who prints, imports, produces, reproduces, publishes, sells, issues, circulates, offers for sale, distributes or has in his possession for such purpose any prohibited publication	Prohibition of producing, reproducing, publishing, circulating, distributing the publication of any article, photograph, report, notes, writing, sound, music, statement or any other thing which is in any manner prejudicial to or likely to be prejudicial to public order, morality, security, or which is likely to alarm public opinion, or which is or is likely to be contrary to any law or is otherwise prejudicial to or is likely to be prejudicial to public interest or national interest.

5.2.10 Novelty Requirements in Patent Law

Under the *Malaysian Patents Act 198*3, novelty is one of the three conditions of patentability besides inventive steps and industrial application.[860] The Act further states that an invention is novel only if it is not anticipated by prior art.[861] Prior art according to the Act, consists of everything disclosed to the public, anywhere in the

860 *Patents Act 1983* (Malaysia), s 14(1) – Patentable inventions.

861 Ibid s 14(1) – Novelty.

world.[862] While the Act does not specifically includes research data as prior art of an invention, the presence of the word "everything disclosed" means that research data about an invention which is disclosed to the public could also amount to prior art under the Malaysian Patents Act.

The inclusion of research data about an invention as among "everything disclosed" is consistent with the legal position in the UK and Australia. The *UK Patents Act 1977* provides that the state of the art in the case of an invention shall be taken to comprise all matter whether a product, a process, information about a product or a process, or anything else.[863] In the *Patents Act 1990 (Commonwealth Australia*, prior art information has also been defined as information in relation to deciding whether an invention is or is not novel.[864] Since data is also a form of information, it could be inferred that disclosure of research data about an invention becomes part of prior art which defeats novelty requirements.

The novelty requirements are discussed in the High Court case of *SKB Shutters Manufacturing Sdn Bhd v Seng Kong Shutter Industries Sdn Bhd & Anor*. Azahar Mohamed J in his judgment on the novelty requirements in the *Malaysian Patents Act* rules that:

> The Act therefore requires an invention to be new in the sense that on the date of filing of patent application, it should not form a part of the state of the art. The invention is not novel if it is anticipated by prior art and prior art consists of everything disclosed to the public anywhere in the world by written publication, oral disclosure and by use or in any other way before the priority date of the patent application claiming the invention. [865]

As stated in the judgment, disclosure of the invention to the public, anywhere in the world, prior to the priority date of the patent application claiming the invention, defeats the novelty requirements in patent law.[866] Under the *Malaysian Patents Act*,

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862 Ibid s 14(2)(a) – Novelty.
863 *Patents Act 1977* (UK), s 2(2) – Novelty.
864 *Patents Act 1990* (Commonwealth Australia), Schedule 1.
865 *SKB Shutters Manufacturing Sdn Bhd v Seng Kong Shutter Industries Sdn Bhd & Anor* [2011] 2 MLJ 790.
866 *Patents Act 1983 (*Malaysia), s 14(2)(a) – Novelty.

the priority date of an application for a patent is the filing date of the application.[867] Therefore, a public disclosure of research data about an invention before a patent application is filed by the inventor could defeat the right to patent. In the case of *Besalon International Ltd & Ors v South Strong Industries Sdn Bhd* , Kamalanathan Ratnam J held that:

> Any prior use or prior publication in Malaysia will therefore destroy the novelty. It may well be however, that the novelty will still exist in the United Kingdom and the original design registration may remain valid on the United Kingdom register in terms of novelty. This is simply because the question of novelty is territorial. [868]

In the case of *Three V Marketing Sdn Bhd v Heng Capital Industries (M) Sdn Bhd (The Registrar of Industrial Design, interested party),* Azahar Mohamed J held that disclosure to the public within the meaning of s 12(2)(a) of the Act may be brought about in two ways: (a) by prior use of the design, by selling or displaying to the public an article to which the design had been applied; or (b) by prior publication in documents.[869] The judge in the above case only refers to disclosure by way of prior use, sales, display or publication in documents. The case does not specifically mention that data about an invention which is released in open access repository is considered as a disclosure that could defeat novelty requirements. However, as disclosure to the public could take place both oral and written, or in any other way, releasing the research data about an invention in open access repository may amount to public disclosure under the Act.

The above view is consistent with the Court's decision in the case of *Heveafoam Asia Sdn Bhd v PF (Teknologi) Sdn Bhd*. The Court in the case held that there was disclosure to the public by way of availability of the documents in the libraries accessible to the public prior to the filing date. The documents which defeat the novelty of the invention were found in two different public libraries which are available and accessible to members of the public or people in the rubber trade or profession and constitutes disclosure to public in Malaysia. Therefore, it was decided in the Heveafoam case that the defendant's invention was not new in Malaysia as it

867 Ibid s 27A – Priority Date.

868 *Besalon International Ltd & Ors v South Strong Industries Sdn Bhd* [1997] 2 MLJ 131 at 147.

869 *Three V Marketing Sdn Bhd v Heng Capital Industries (M) Sdn Bhd (The Registrar of Industrial Design, interested party)* [2010] 2 MLJ 807.

was anticipated by prior art.[870] Applying this case, release of the research data about an invention in open access repository shall amount to disclosure under the *Malaysian Patents Act*.

Despite the novelty requirements, the *Malaysian Patents Act* provides that a public disclosure made under paragraph (2)(a) shall be disregarded if such disclosure was made by the applicant or his predecessor in title within one year preceding the date of the patent application.[871] A one-year grace period between the public disclosure of the invention and the date of patent application, means that premature disclosure will not defeat novelty of the invention, provided the patent application is filed within the given time frame. It also means that the inventor could disclose the research data about an invention without jeopardising the inventor's right to apply for a patent, provided the patent application is submitted within one year after the disclosure was made.

The legal analysis found that, the novelty requirements under the *Malaysian Patents Act* prohibits disclosure of research data about an invention until patent application has been filed. The novelty requirements in the Malaysian patents law is illustrated in Table 5.2.10 below.

Table 5.2.10 Novelty requirements in patent law

WHAT SHOULD NOT BE DISCLOSED	TO WHOM THE PRIOR ART SHOULD NOT BE DISCLOSED	MANNER OF DISCLOSURE	CONSEQUENCE OF DISCLOSURE	EXCEPTION
Prior art of the invention which includes research data about an invention	To the public, anywhere in the world	Written, oral, use or in any other way such as releasing research data about an invention in open access repository	An invention is not novel and shall not be regarded as patentable invention	If the patent application is made within one year after the disclosure was made

5.2.11 Lack of a Legal Duty to Ensure Data Quality

In term of a legal duty to ensure data quality, Adibah et al found that Malaysia has no specific law on matters concerning data accuracy, the liability of data providers and

870 *Heveafoam Asia Sdn Bhd v PF (Teknologi) Sdn Bhd* [2001] 2 MLJ 660 at 673.
871 *Patents Act 1983* (Malaysia), s 14(3)(a) – Novelty

the standard of duty to be exercised to prevent the harm or damages to the data users.[872] In the absence of specific law, the *Malaysian Multimedia Communications and Multimedia Content Code* (the Code) imposed a voluntary duty on the content providers to ensure that the content is not false, misleading or incomplete. [873] The Code also requires the content provider to take reasonable measures to verify the truth of the content prior to communications to the public.[874]

The term "content" under the Code means any sound, text, still picture, moving picture or other audio-visual representation, tactile representation or any combination of the preceding which is capable of being created, manipulated, stored, retrieved or communicated electronically. The "content provider" under the Code includes the Code subject who makes available the content with full knowledge and control over the substance of such Content.[875] The broad interpretations given to the terms "content" and "content provider" mean that open access data providers who have both control and knowledge of such content are also subject to this Content Code.[876] Although the Content Code states that compliance with the Code shall be a defence against any prosecution, action or proceeding of any nature under the *Communications and Multimedia Act*,[877] the fact remains that compliance with the Content Code is voluntary and non-compliance is not a violation of any written law.

Further evidence of lack of a legal duty to ensure data quality in Malaysia could be drawn from several case laws involving information providers who provide erroneous, inaccurate or defective information. In the case of *Assets Investments Pte Ltd v OSK Securities Ltd*, it was held that a duty of care is likely to arise only where the defendant assumes the responsibility of providing advice to a plaintiff and knows or ought to know that the plaintiff is likely to rely on that advice.[878] In another case, *KGV & Associates Sdn Bhd v The Co-Operative Central Bank Ltd*, the Court of

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872 Adibah Awang, Shahidah Mohd Ariff and Ahmad Fauzi Nordin, 'Geo-Spatial Data Accuracy and its Legal Implications in the Malaysian Context' (Paper presented at the Conference for Asia and the Pacific, Bangkok, 26 - 29 October 2009 2009) 4, 7.

873 *The Malaysian Communications and Multimedia Code Version 6,* Reg 6.1, Part 1 Introduction – legal status of the code.

874 Ibid [7.2] Guidelines on Content – false content.

875 Ibid [12.1] Part 5, Specific Online Guidelines – content provider.

876 Ibid [5.1] Part 1, Definitions and Interpretation – content.

877 Ibid [6.2] Part 1 Introduction – Legal Status of the Code.

878 *Assets Investments Pte Ltd v OSK Securities Ltd* [2005] 6 MLJ 643 at page 645, 652.

Appeal held that one useful guide is to ascertain whether a duty of care exists against an information provider is by determining whether there is an assumption of responsibility. The Court in this case held that there is no assumption of responsibility to the third party as the valuer who provides the information in its report disclaims responsibility to a third party who relies on their statement in the absence of their prior-knowledge and consent.[879]

On further appeal by the plaintiff in the KGV case, the Federal Court held that on policy grounds a professional should not be held to owe a duty to persons unknown as it would impose an intolerable burden upon those who give advice in professional or commercial contracts if they were to owe a duty not only to whom they give the advice but also to any other person who might choose to act upon it.[880] Based on the judicial decisions in the KGV case at the Federal Court and the Court of Appeal, it could be inferred that an open access data provider will not be liable to the unknown party unless it could be shown that the open access data provider assumes responsibility to the data users, who act based on their reliance on the content of the research data. It is also found from the case that the assumption of responsibility by an open access data provider could be rebutted by the presence of a disclaimer to the third party who may also rely on the information.

Further, the Malaysian Court of Appeal in the case *Sim Thong Realty Sdn Bhd v Teh Kim Dar*,[881] rules that the party who seeks remedy in damages in the tort of negligence under the assumption of responsibility and reliance doctrine laid down in *Hedley Byrne & Co Ltd v Heller & Partners* must plead and prove a special relationship giving rise to a duty of care as well as the other elements that go to constitute the tort of negligence. In another case, *Assets Investments Pte Ltd v OSK Securities Ltd*, it was held by the Court that the relationship must be close and direct to enable a duty of care to be owed by the defendant in the representation made to the plaintiff.[882] By applying Sim Thong Realty and Assets Investment cases, it is necessary to determine whether the open access data providers who voluntarily share

879 *KGV & Associates Sdn Bhd v The Co-Operative Central Bank Ltd* [2006] 5 MLJ 513, 520.

880 *The Co-Operative Central Bank Ltd v KGV & Associates Sdn Bhd* [2008] 2 MLJ 233 at page 247.

881 *Sim Thong Realty Sdn Bhd v Teh Kim Dar* [2003] 3 CLJ 227 at page 240.

882 *Assets Investments Pte Ltd v OSK Securities Ltd* [2005] 6 MLJ 643 at page 645, 652.

their research data are in a "special relationship" with the user of the information. It can be argued that the research data provided by open access data producers voluntarily, with no profit motives, is different from the commercial relationships between the suppliers or service providers which gives rise to a duty of care under contracts.

Even if there was a special relationship between open access data providers and the data users, the duty of care will only be imposed if the judge is satisfied that it is fair and reasonable that the party should owe a duty of care to the person who relies on his information.[883] In the case of *Ku Pon & Ors v Pemandangan Sinar Sdn Bhd & Ors*,[884] the plaintiff brought an action against a local daily for negligent publication. The High Court held that in determining the prerequisite of it being fair, just and reasonable to impose a duty of care, the court would take into consideration:

i. the principle of legal policy;
ii. the factor of where to draw the line so as to avoid the floodgates of litigation being unleashed;
iii. the interest of individuals who may already have the protection of statutes;
iv. factor of public awareness and deterrence against would-be offenders; and
v. where the parameter of liability would stop and the factor of freedom of press which has a social and moral duty to the world at large.

Upon considering the above factors, the Court found that it was unfair, unjust and unreasonable to impose such a liability in negligence against the defendant who published the information.[885] The Ku Pon case demonstrates that there are various factors which the court will consider, before deciding whether it is fair and reasonable to impose a duty of care on open access data providers to ensure data quality.

Another case dealing with the question whether it is fair and reasonable to impose a duty of care on the data provider is the case of *The Registrar of Motor Vehicles, Malacca & Ors v KS South Motor Sdn Bhd.*[886] The issue before the court was

883 See *Dato' Zamzuri Bin Ghaffar v BIMB Trust Ltd and Others* [2010] MLJU 952; *OSK & Partners Sdn Bhd & Anor v Assets Investment Pte Ltd & Anor* [2008] 4 MLJ 914 at page 916.
884 *Ku Pon & Ors v Pemandangan Sinar Sdn Bhd & Ors* [2004] 6 MLJ 253 at page 254.
885 Ibid.
886 *The Registrar of Motor Vehicles, Malacca & Ors v KS South Motor Sdn Bhd* [2000] 2 MLJ 540.

whether the law imposes a duty on a public authority to take care that all information supplied by them to a class of persons who relies on such information, is accurate and authentic. In this case, the duty sought to be imposed on the appellants was the duty to take care that all information given by them to a paying class of persons who seek information is accurate to enable that class of persons to conduct private and commercial transactions in relation to the particular vehicle on which the information is sought. The appellants who are the suppliers of the information submit that it is unfair, unjust and unreasonable to impose such a duty on the as it would practically immobilise their statutory function of registering and maintaining a register of all vehicles on the road.[887]

The presiding judge in the above case, Siti Norma Yaakob JCA in her judgment wrote that the Court considered that every particular information recorded in the files of a registered vehicle is a representation that such information is accurate and reliable as the paying public particularly owners of motor vehicles, would be purchasers of such vehicles and those involved in the motor trade like the respondent, rely on such information to conduct private and commercial transactions. It is the concept of general reliance that imposes a duty on the appellants to take care that all information coming from them is accurate. The law should be that, on payment of a fee a duty to take care must exist to ensure every particular information recorded in the registers maintained by the appellant is accurate and reliable, to enable them to rely on such information. Therefore the Court rules that the duty of care is owed to the paying party and not to the general public. [888] Based on the Registrar of Motor Vehicles' case, it could be inferred that data providers who charge a fee to data users will owe a duty of care to data users to ensure data quality. It follows that, open access data providers who do not charge a fee to data users will most unlikely owe a duty of care to data users to ensure data quality.

The legal analysis found that, there is lack of a legal duty to ensure data quality imposed on open access data providers in Malaysia. Even in the presence of such duty of care, the Malaysian court is ready to accept disclaimer as defence provided it

887 Ibid.
888 Ibid 546-548.

is a written disclaimer as opposed to oral disclaimer.[889] Lack of a legal duty to ensure data quality is illustrated in Table 5.2.11 below.

Table 5.2.11 Lack of a legal duty of to ensure data quality

LEGAL DUTY UNDER	STANDARD OF CARE REQUIRED	THE OPEN ACCESS DATA PROVIDER WHO OWES THE LEGAL DUTY	THE OPEN ACCESS DATA PROVIDER WHO DOES NOT OWE THE LEGAL DUTY
The Malaysian Communications and Multimedia Content Code	Voluntary duty not to provide false, misleading, incomplete, untruth content	Open access data provider who has full knowledge and control over the content of research data which are provided online.	Open access data provider categorised as Innocent Carriers such as the Internet Access Service Provider & the Internet Content Hosting Provider who does not have full knowledge and control on the content.
The Law of Tort			
KGV & Associates Sdn Bhd v The Co-Operative Central Bank Ltd	Legal Duty of Care Not to Provide Erroneous, Inaccurate and Defective Data	Open access data provider who assumes responsibility as to the quality of the research data	Open access data provider whose information was relied or acted upon by the third party in the absence of data provider's prior-knowledge and consent Open access data provider who placed a disclaimer to the third party who may rely on the information.
Sim Thong Realty Sdn Bhd v Teh Kim Dar		Open access data provider is under "special relationship" with the data user such as under commercial contracts or upon specific request by data user	Open access data provider who provides the research data voluntarily, without profit.
Assets Investments Pte Ltd v OSK Securities Ltd		Open access data provider who has close and direct relationship to the user who relies on the information.	Open access data provider who does not know or ought not to know that the user is likely to rely on that information
Ku Pon & Ors v Pemandangan Sinar Sdn Bhd & Ors		Open access data provider against whom the judge satisfies that it is fair and reasonable for them to owe a duty of care to the data users.	Open access data provider whom the court finds that it is unfair and unreasonable to impose a legal duty of care
The Registrar of Motor Vehicles, Malacca & Ors v KS South Motor		Open access data provider who accepts payment owes a duty of care to the paying party	Open access data provider who provides the research data for free or without profit

[889] See *Tegas Baiduri Sdn Bhd v BIMB Trust Ltd & Ors* [2011] 8 MLJ 226.

Sdn Bhd		to ensure every particular information is accurate and reliable to enable them to rely on such information.	

5.3 SUMMARY

From the legal analysis, it can be summarised that the legal impediments identified in Chapter 4 do exist within the Malaysian legal landscape. A report prepared by the Canadian International Development Research Centre argues that in order to derive the maximum benefit arising from open access to data, the legal issues which impede open access to research data must be resolved.[890] It is also argued by Graham Greenleaf that to support greater access to government funded research works, there is a need to deal with a myriad of legal issues surrounding them.[891] The intellectual property legal experts and scholars such as Uhlir and Schroder,[892] Moskovkin,[893] Arzberger et al,[894] Lievesley,[895] Ambruster, [896] Anne Fitzgerald and Brian Fitzgerald of the Open Access to Knowledge (OAK) Law Project,[897] have all argued for the legal issues surrounding data access and re-use to be resolved through comprehensive policies and procedures supported by a complete set of principles and guidelines.[898] Based on these arguments, it is hereby submitted that, in enabling open access to and re-use of publicly funded research data in Malaysian public universities it is important to ensure that these legal impediments are resolved at policy level. Therefore, the research question which is to be answered in the preceding chapter is: Have the legal impediments which exist under the Malaysian laws been resolved by the existing policies of Malaysian public universities?

890 See Christian, above n 523, 3.
891 Graham Greenleaf, 'Unlocking IP to Stimulate Australian Innovation: An Issues Paper' (University of New South Wales, 2008).
892 Uhlir and Schroder, above n 125, 216-217.
893 Moskovkin, above n 126, 269.
894 Arzberger et al, above n 127, 1777.
895 Lievesley, above n 128.
896 Armbruster, above n 129, 17.
897 Fitzgerald et al, above n 133, 284.
898 See 1.7 – Significance of this Thesis

CHAPTER 6
ANALYSIS OF THE POLICIES OF THE MALAYSIAN PUBLIC UNIVERSITIES

6.1 OVERVIEW

Chapter 5 found that the legal impediments to open access and re-use identified in this thesis do exist under the Malaysian laws.[899] It was argued that enabling open access to and re-use of publicly funded research data in Malaysian public universities requires the legal impediments to be resolved at policy level. Following the argument, this chapter is set to answer the fourth research question: Have the legal impediments that exist under the Malaysian laws been resolved by the existing policies of Malaysian public universities? To answer the research question, this chapter analyses the existing policies of Malaysian public universities dealing with the legal impediments.

The policy analysis covers the intellectual property, research, repository, confidentiality, privacy and security policies of Malaysian public universities. There are 20 public universities in Malaysia comprising five public research universities and 15 public non-research universities.[900] The public non-research universities are further divided into two sub-categories i.e. comprehensive universities and focus universities. Comprehensive universities are public universities which act as educational centres for pre-undergraduate, undergraduate and post-graduate programs in various fields, without focusing on any one area.[901] Four public non-research universities in Malaysia are listed under the category of comprehensive universities.[902]

899 See 5.2 – Legal Analysis

900 The five research universities are: University of Malaya (UM); National University of Malaysia (UKM); University of Science Malaysia (USM), Putra University Malaysia (UPM) and University of Technology Malaysia (UTM). See 'Categories of Public HEIs', above n 68.

901 'Categories of Public HEIs', above n 68.

902 Those four universities are: MARA University of Technology (UiTM), International Islamic University of Malaysia (IIUM), University of Malaysia Sabah (UMS) and University of Malaysia Sarawak (UNIMAS). See 'Categories of Public HEIs', above n 68.

There are 11 focus universities in Malaysia, each university with its own field of specialisation. [903] Five focus universities specialise in technical fields,[904] and three focus universities specialise in management.[905] Sultan Idris Teaching University (UPSI) is the only focus university specialises in education, while the Malaysian National Defence University (UPNM) is the only focus university specialises in defence. The policy analysis is conducted on the existing policies from each category of Malaysian public universities i.e. research university, comprehensive university and focus university from each field of specialisation (technical, management, education and defence).

In conducting the policy analysis, two critical aspects are analysed:

i) what are the legal impediments which have been resolved by the existing policies?; and
ii) what are the legal impediments which have not been resolved by the existing policies?

The policies selected for analysis are either published in printed form or posted on the university's official website. Where the policies are known to exist but neither published nor posted online, official requests were made to the university's administrators to obtain the policies. Hence, the policies which become the samples of analysis are those policies which could be obtained from the university either from print publication, online posting or made available by the universities upon request.

6.2 POLICY ANALYSIS

6.2.1 Intellectual Property Protection of Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with intellectual property protection. The objective of the analysis is to find out if

903 See 'Focus U' (2010) *Ministry of Higher Education*, <http://www.portal.mohe.gov.my/portal/page/ExtPortal/IPT/FocusU> (at 17 January 2010).

904 Those universities are: University of Malaysia Perlis (UNIMAP), Malaysian Technical University Malacca (UTEM), Tun Hussein Onn Technical University (UTHM), University of Malaysia Pahang (UMP) and University of Malaysia Terengganu (UMT).

905 Those universities are: the Northern University of Malaysia (UUM), Sultan Zainal Abidin University (USZA) and University of Malaysia Kelantan (UMK).

the legal impediment arising from intellectual property protection of research data has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

A. Policies of the Research University

The Intellectual Property Policy for University of Malaya 2010 (UM IP Policy) sets out University of Malaya's policies in relation to intellectual property rights arising from research, innovation, invention and creative output.[906] The objectives of the policy is to establish a framework for the encouragement of research, innovation, invention, creative works and technology transfer.[907] Under UM IP Policy, "intellectual property" comprises all tangible output that results from the exercise of the human brain, such as ideas, inventions, designs, drawings, paintings, written works and music. UM Policy also includes intangible research outputs such as computer programs and databases as part of intellectual property governed by its IP policy.[908] UM IP Policy states that copyright protection is granted under the Copyright Act 1987 to literary, and other works such as sound recordings, published editions and derivative works.[909] UM IP Policy does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

The National University of Malaysia Intellectual Property Policy 2010 (UKM IP Policy) sets forth UKM's policies in relation to the management of intellectual property rights arising from research.[910] In UKM IP Policy, "intellectual property" has been defined as all forms of intellectual property protected under the laws of Malaysia or other legislations on intellectual property.[911] In respect of copyright, UKM IP Policy explains that copyright is the protection granted under the Copyright Act 1987 for original literary works, musical works, artistic works, sound recordings

906 Intellectual Property Policy for UM 2010, objectives, [1(2)].
907 Ibid [1(1)] objectives.
908 Ibid [2(1)] Intellectual Property Rights.
909 Ibid Copyright [2(a)] types of IPR under Malaysian laws.
910 UKM Intellectual Property Policy 2010, Purpose of Policy, [1.1].
911 Ibid [2.4] Intellectual Property – definitions.

and broadcast.[912] UKM IP Policy does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

The Putra University of Malaysia Statute (Intellectual Property) 2003 (UPM IP Policy) empowers the University's Intellectual Property Committee (IPC) to advise the Vice-Chancellor whether the University has any rights on intellectual property and under what circumstances the University should manage the intellectual property rights of the University. [913] Under UPM IP Policy, "intellectual property" means information, idea, invention, innovation, art works, designs, literature texts or other subject matters and include patent, confidential information, trade secrets, copyright in literary works (including computer programs), drama, musical, arts, films, sound recording, audio, broadcasting, published edition and performance.[914] UPM IP Policy does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

The University of Science Malaysia Intellectual Property Policy 2009 (USM IP Policy) aims to create an environment in which innovation, research and development flourish. The policy provides that knowledge and ideas should be made available for the benefit of the entire community. USM IP Policy facilitates the management and protection of intellectual property created by all persons to whom the USM IP Policy shall apply.[915] In USM IP Policy, the term "intellectual property" includes any proprietary right under intellectual property law such as patents, copyrights, trademarks, industry designs and other rights resulting from intellectual activity in the industrial, commercial, scientific, literary and artistic fields.[916] USM IP Policy does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

The University of Technology Malaysia Intellectual Property Policy 1999 (UTM IP Policy) sets out how UTM proposes to manage intellectual property rights and issues

912 Ibid [3.1] Intellectual Property Rights.
913 UPM Statute (Intellectual Property) 2003, Intellectual Property Committee, [5(3)].
914 Ibid [2] Interpretation - intellectual property.
915 USM Intellectual Property Policy 2009, Preamble, [1.1.3].
916 Ibid [2.0(i)] – [2.0(xii)] Definition – IP.

so as to best meet the policy objectives.[917] The objectives of UTM IP Policy is to create the climate for innovation and invention.[918] Under UTM IP Policy, intellectual property includes copyright as governed by the Copyright Act 1987, Copyright (Amendment) Act 1990 and the Regulations made there under which cover literary and artistic works. UTM IP Policy further states that the forms in which such copyright works are expressed may be words, symbols, music, pictures, three-dimensional objects, or combinations thereof.[919] UTM IP Policy does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

B. Policies of the Comprehensive University

Among the comprehensive universities (CompU), University of Malaysia Sarawak (UNIMAS) is the only university which makes available its policy dealing with intellectual property protection. Therefore, policy analysis is made of the existing policies of UNIMAS.

The Intellectual Property Policy of UNIMAS (UNIMAS IP Policy) aims among others are to promote, sustain, encourage and aid scientific investigation and research of the University.[920] UNIMAS IP Policy provides guidance on the University's practices with regards to intellectual property management.[921] In UNIMAS IP Policy, the term "intellectual property" includes any patentable invention, know-how, copyright of works, layout design of integrated circuits, tangible research property, rights relating to computer software, trade mark and any other industrial property rights, registrable, registered or otherwise.[922] According to UNIMAS IP Policy, "know-how" among others includes any recipe, formula, design, plan, documentation, drawing, data and other technical information.[923] The term "tangible research property" on the other hand are research results that are in a tangible form including items such as materials, drawings, integrated circuit chips, computer

917 Intellectual Property Policy of UTM 1999, Part 1– Introduction and Objectives.
918 Ibid Part 1- Introduction and Objectives.
919 Ibid Part 2 Definitions- Intellectual Property.
920 UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006, Aims of the Policy, [1.21].
921 Ibid [1.1] Introduction – general statement.
922 Ibid [1.3] Definitions – intellectual property.
923 Ibid [1.3] Definitions – know-how.

software, computer and other databases, processes, prototypes and circuit diagrams.[924] UNIMAS IP Policy does not require data owner to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

C. Policies of the Focus University

For the focus universities specialise in the technical field (TechU), policy analysis is made of University of Malaysia Perlis Intellectual Property Policy (UNIMAP IP Policy). Among the objectives of UNIMAP IP Policy is to create an environment that encourages and expedites the dissemination of discoveries, creations and new knowledge generated by research for the greatest public benefit. Another objective is promotion, preservation, encouragement of and assistance to scientific investigation and research.[925] The intellectual property rights covered by UNIMAP IP Policy comprise all tangible output which results from the exercise of the human brain, such as ideas, inventions, designs, drawings, paintings, written works and music. UNIMAP IP Policy also includes computer programs, layout-designs of integrated circuits, plant varieties and databases.[926] UNIMAP Policy does not require data owner to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

For the focus universities specialise in management (MgtU), policy analysis is made on the Northern University of Malaysia Intellectual Property Policy (UUM IP Policy). UUM IP Policy deals with management, commercialisation and exploitation of the intellectual property rights arising from research, innovation, invention and creative works. [927] According to UUM IP Policy, the term "intellectual property rights" covers all tangible outputs such as ideas, inventions, designs, sketched, drawings, writing works and music. Also included as intellectual property are computer programs and databases.[928] UUM IP Policy does not require data owners

924 Ibid.
925 UNIMAP Intellectual Property Policy 2007, Objectives, [1].
926 Ibid [3(A)] Intellectual Property Rights.
927 UUM Intellectual Property Policy, Objectives, [1(2)].
928 Ibid [2] Intellectual Property Rights.

to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

For the focus university specialises in education (EduU), the Sultan Idris Teaching University Innovation and Commercialisation Guidelines (UPSI Guidelines) require an application be made to protect the intellectual property of the University which include patents, utility innovations, trade marks, copyrights and industrial designs, geographical indications and integrated lay-out circuits.[929] UPSI Guidelines do not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

For the focus university specialises in defence (DefU), the Malaysian National Defence University Research and Innovation Policy (UPNM R&I Policy) does not require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection.

The policy analysis is illustrated in Table 6.2.1 below.

Table 6.2.1 Whether the policies require data owners to permit open access to and re-use of publicly funded research data which is subject to intellectual property protection?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	No

From the above analysis, it is found that the legal impediment arising from intellectual property protection of research data has not been resolved by the existing policies of Malaysian public universities.

929 Innovation and Commercialization Guidelines of UPSI, [4.1(1)]-[4.1(7)].

6.2.2 Ambiguity About Ownership of Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with ownership of research data. The objective of the analysis is to find out if the legal impediment arising from ambiguity about ownership of research data has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies clarify ambiguity about ownership of publicly funded research data created by: i) a university employee in the course of employment; ii) a university employee outside the course of employment; iii) a non-employee university researcher; iv) a university student; and v) a university researcher under research collaboration with a non-university researcher.

A. Policies of the Research University

Under UM IP Policy, "employees of the university" means any person employed by UM under the university's Constitution and any other Statutes and includes any officer, teacher or staff of the university. The term 'teacher' includes a senior professor, professor, reader, associate professor, senior lecturer, lecturer, assistant lecturer, language and matriculation teacher, and tutor. [930] UM IP Policy provides that the university shall own intellectual property created by the employees of the university regardless whether they are created in the course of their employment or not.[931] UM Policy makes it clear that the university claims ownership of intellectual property created by university employees in and outside the course of employment. However, UM IP Policy does not make it clear whether the claim of ownership includes publicly funded intellectual property. UM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by the university employee.

Under UM IM Policy, a non-employee university researcher is referred to as "visitor". UM IP Policy provides that, where the intellectual property is generated, created or developed by a visitor at the university using funds provided or obtained by or through the university, the visitor is required to disclose the intellectual

930 Intellectual Property Policy for UM 2010, Definition – employee of the university, [4].
931 Ibid [5(1)(a)(ii)] Ownership of IPR : employee of the university .

property to the university and the university reserves the right to claim ownership or any other rights to the intellectual property.[932] Since UM merely reserves the right to claim ownership, it does not claim ownership by default, instead ownership claim is on a case by case basis. This provision has resulted in ambiguity about ownership of intellectual property created by a visitor at the university. UM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a non-employee university researcher.

UM IP Policy also states that UM asserts and claims any worldwide right, title, interest to or in any intellectual property generated and created by students where its generation and creation has required use or support of funds provided or obtained by or through the University.[933] Since public research funding is provided or obtained by or through the University, this provision includes publicly funded intellectual property. UM IP Policy clarifies ambiguity ownership of publicly funded research data created by a university student.

UM IP Policy provides that ownership of intellectual property created pursuant to a research collaboration, shall be governed by the terms of the agreement.[934] Since, ownership of intellectual property is determined by agreement and not by the policy, there is ambiguity about ownership of publicly funded research data created under research collaboration. UM IP Policy does not clarify ambiguity about ownership of publicly funded research created by a university researcher under research collaboration with a non-university researcher.

UKM IP Policy has a broad interpretation of the term "employee" which includes any person employed by UKM, part-time or full time, contractual or permanent, and includes both academic staff and non-academic staff.[935] UKM IP Policy provides that, unless otherwise agreed in writing or as stated in the policy, UKM owns all rights of intellectual property created by employees, particularly where the intellectual property is created, developed or generated using the funds owned by

932 Ibid [5(3)(b)] Ownership of IPR : student.
933 Ibid [5(2)(b)(i)] Ownership of IPR : student.
934 Ibid [6 (1)] Intellectual Property created under Agreements with Third Parties.
935 UKM Intellectual Property Policy 2010, Definitions, [2.8].

UKM.[936] UKM IP Policy does not make it clear whether "the funds owned by UKM" includes publicly funded funds. UKM IP Policy also does not make it clear whether UKM owns all rights of intellectual property created by employees in and outside the course of employment. UKM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university employee in and outside the course of employment.

Under UKM IP Policy, a non-employee university researcher is referred as "associate", which includes any research collaborators, visiting researchers, consultants, fellows, or any other person, entity or body corporate invited by UKM for academic or research purposes.[937] UKM IP Policy requires the associate to assign in writing the intellectual property rights to UKM when the intellectual property is created, developed or otherwise generated using the facilities, material, funds or other resources owned by UKM.[938] UKM IP Policy does not make it clear whether the "funds or other resources owned by UKM" include public research funds. UKM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a non-employee university researcher.

UKM has a supplementary intellectual property policy for the intellectual property created by the university student, known as the UKM Student IP Policy (Supplementary). UKM Supplementary IP Policy states that the university requires students to assign in writing their intellectual property to UKM where the intellectual property is created, developed or otherwise generated using UKM funds.[939] UKM Supplementary IP Policy does not make it clear whether "UKM funds" include funds from public research funding agencies. UKM Supplementary IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university student.

UKM IP Policy provides that ownership of all intellectual property created by the University researcher under collaborative research agreement, shall be governed by

936 Ibid [4.1(b)(ii)], [4.2(b)(ii)], [4.3(b)(i)] Definitions.
937 Ibid [2.13] Definitions.
938 Ibid [4.3(b)] Associates.
939 UKM Student IP Policy (Supplementary) 2010, Ownership of IPRS Created By Students, [4.2(b)].

the terms of agreement.[940] Since ownership of intellectual property is determined by the agreement and not by the policy, there is ambiguity about ownership of publicly funded research data created under research collaboration. UKM IP Policy does not clarify ambiguity about ownership of publicly funded research data which is created by a university researcher under research collaboration with a non-university researcher.

UPM IP Policy provides that the University shall be the owner of all intellectual properties which are created using the funds contributed by the university or by the third party on behalf of the University or pursuant to an agreement with the University.[941] It could be inferred that this broad provision includes intellectual property created from publicly funded research regardless of whether the researchers are the university employees or not, and regardless of whether the publicly funded intellectual property is created in or outside the course of employment. Based on the above provision, UPM IP Policy clarifies ambiguity about ownership of publicly funded research data created by a University employee in and outside the course of employment. It also clarifies ambiguity about ownership of publicly funded research data created by a non-employee researcher and a student of the University. Also clarified is ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

USM IP Policy defines "employee" as any person employed by the University under the University's Constitution and Statute.[942] USM IP Policy states that the university claims full ownership and worldwide right, title and interest to or in all intellectual property in all works, inventions, designs and other subject matter which are created and developed, generated or otherwise brought into existence by academician, employee trainee of the academic staff training scheme and post-doctoral fellow of the university with the use or the support of funds provided or obtained by or through the University.[943] Since public research funding from the Malaysian Government is obtained by or through the university, it therefore includes intellectual property created from publicly funded research. USM IP Policy clarifies ambiguity about

940 UKM Intellectual Property Policy 2010, IPR Created Under Agreement with Associates, [5.1].
941 UPM Statute (Intellectual Property) 2003, Ownership of IP, [3(1)], [3(2)(c)].
942 USM Intellectual Property Policy 2009, Definition, [2.0]
943 Ibid [4.1.2] Ownership of IP.

ownership of publicly funded research data created by a university employee both in and outside the course of employment.

Under USM IP Policy, a non-employee researcher is referred to as a visitor. The term "visitor" is defined as any person, other than an employee who is officially invited by the University for academic or research purpose.[944] USM IP Policy states that USM claims ownership of all right, title or interest to or in any intellectual property created by visitors at the university unless provided otherwise in a written agreement.[945] USM IP Policy does not make it clear whether the university also claims ownership in the intellectual property created by the University's visitors using the funds provided by the Malaysian public research funding agencies. USM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a non-employee researcher.

USM IP Policy also states that the University shall have full ownership of all right, title, interest to or in any intellectual property generated or created by students using the funds provided or obtained through the university.[946] Through this provision, USM IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university student. USM IP Policy also states that ownership of the intellectual property created from a project in collaboration with other agencies shall belong to the university unless the contrary is provided in the contract agreement.[947] With such provision, USM IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

Under UTM IP Policy, an employee and a non-employee researchers of the University are referred to as "Staff". UTM IP Policy defines "Staff" as all academic, research, and general staff or any person who is employed by UTM pursuant to a contract of employment, whether full time, part time, contract, sessional or casual, and including persons invited to participate in the research program of the university

944 Ibid [2.0] Definition
945 Ibid [4.7] Ownership of IP.
946 Ibid [4.5.1] Ownership of IP.
947 Ibid [4.10] Ownership of IP.

as a visiting fellow or research fellow.[948] UTM IP Policy provides that the university owns worldwide right, title and interest in any invention made at least in part by the University staff, or with substantial use of university resources, whether or not the staff remain employees of the university.[949] "University Resources" includes funding for research provided by the University to its staff or originator of the intellectual property. [950] With such provisions, UTM IP Policy clarifies ambiguity about ownership of publicly funded research data created by the University's employees in and outside the course of employment. Also clarified is ambiguity about ownership of publicly funded research data created by a non-employee university researcher.

UTM IP Policy reserves the right, prior to the student participating in any research project in which university funds will be used, to require the student to assign to the university any intellectual property arising or subsisting in or in respect of any invention, work or other material authored, invented, or created by the student in the course of working on that project.[951] Since UTM IP Policy only reserves the right to require assignment, it is not clear whether the university will claim ownership to the intellectual property. UTM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university student.

UTM IP Policy requires the University to enter with the third party into an agreement which governs the ownership and exploitation of intellectual property.[952] It means that where the intellectual property is created by a university researcher with a third party, ownership of intellectual property is to be determined by the agreement and not by the policy. In such a case, UTM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

948 Intellectual Property Policy of UTM 1999, Part 2 - Definitions.
949 Ibid [3.2] Ownership of Intellectual Property Principles; Part 2 Definitions – university resources.
950 Ibid Part 2 Definitions – university resources.
951 Ibid [3.2] Ownership of Intellectual Property Principles.
952 Ibid [4.1] Agreements with Third Party.

B. Policies of the Comprehensive University

UNIMAS IP Policy states that the University claims ownership of intellectual property which was developed in the course of or pursuant to university research.[953] UNIMAS IP Policy provides that, "university research" shall include all research conducted by its staff members in the course of their employment with the university as part of their duties or in fulfilment of their contract of employment. [954] The term "staff member" has been given a broad interpretation to include both employee and non-employee university researchers such as visiting and adjunct staff members and other researchers carrying out research at the University.[955] Despite its broad interpretation, UNIMAS IP Policy does not make it clear whether university research includes research created by the staff members using public funds. UNIMAS IP Policy does not clarify ambiguity about ownership of publicly funded research data created by an employee (in and outside the course of employment) and a non-employee researchers of the University.

Under UNIMAS IP Policy, "university research" also includes all research for which the students receive advisory, supervisory, technical and/or financial support from the University.[956] UNIMAS IP Policy however does not explain whether the financial support from the university also includes research funds from public research agencies which are given to university students to conduct their research. UNIMAS IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university student.

Further, under UNIMAS IP Policy, all research conducted pursuant to a research agreement between the University and an external party also becomes part of "university research".[957] This implicitly includes research collaboration entered into by a university researcher with a non-university researcher. Although the university claims ownership of intellectual property developed in the course of or pursuant to

953 UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006, Intellectual Property Ownership by the University, [3.1.1].
954 Ibid [3.1.2.1] Intellectual Property Ownership by the University.
955 Ibid [1.3] Definitions – Staff Member.
956 Ibid [3.1.2.2] Intellectual Property Ownership by the University.
957 Ibid [3.1.2.3] Intellectual Property Ownership by the University.

university research, it is unclear whether university research includes publicly funded research. UNIMAS IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

C. Policies of the Focus University

UNIMAP IP Policy defines "employee" as any person employed by the university under the university's constitution and any other statutes, and includes any officer, teacher or staff of the university.[958] UNIMAP IP Policy provides that the university asserts and claims worldwide right, title and interest to or in all intellectual property rights in all works, inventions, designs and other subject matter created, developed, generated or otherwise brought into existence by employees of the University with the use or the support of any funds provided or obtained by or through the University.[959] This condition means that the University shall be the owner of publicly funded research data created by University employees both in and outside the course of employment. UNIMAP IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university employee in and outside the course of employment.

Under UNIMAP IP Policy a non-employee researcher is referred to as a visitor. The term "visitor" is defined as any person officially invited by the University for such academic or research purposes and duration as may be agreed upon by the parties other than an employee, a research officer or a student of the university.[960] UNIMAP IP Policy provides that where the intellectual property is created by visitors at the university using funds provided by or obtained through the university, the university requires the visitor to disclose the intellectual property and the University reserves the right to claim ownership or any other rights to the intellectual property disclosed by the visitor.[961] Since UNIMAP merely reserves the right to claim ownership, it is not clear whether UNIMAP will exercise their right to claim ownership of the

958 UNIMAP Intellectual Property Policy 2007, Definitions – employee of the university, [2].
959 Ibid [4] Ownership Right – employee of the university and research officer.
960 Ibid [2] Definitions – visitor.
961 Ibid [4.C.ii] Ownership Right – visitor.

intellectual property. UNIMAP IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a non-employee university researcher.

UNIMAP IP Policy provides that the university will assert and claim worldwide right, title, interest to or in any intellectual property generated or created by students where the generation of the intellectual property has required the use or support of employee of the university, facilities, materials, funds or other resources provided or obtained by or through the University.[962] Based on the above provision, UNIMAP IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university student.

UNIMAP IP Policy provides that the university may enter with other parties into an agreement which governs the ownership of intellectual property.[963] Based on this provision, it could be inferred that ownership of the intellectual property with other parties, including in research collaboration, is governed by the agreement and not by the policy. UNIMAP IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

Under UUM IP Policy, the term "employee" is interpreted as anyone who is being employed by the University pursuant to the University Constitution and any other statutes. The term "employee" also includes officer, teacher or staff of the University.[964] UUM IP Policy provides that unless otherwise agreed in writing, the University claims worldwide ownership to all works, copyrights, patents, designs, created by its employees using funds obtained by or through the University.[965] Based on this provision, UUM IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university employee in and outside the course of employment.

962 Ibid [4.B.ii.a] Ownership Right – student.
963 Ibid [5(i)] Agreements with Third Party.
964 UUM Intellectual Property Policy, Definitions – employee of the university, [4].
965 Ibid [5(1)(a)(ii)] Ownership of Intellectual Property Rights.

Under UUM IP Policy a non-employee researcher is referred to as a visitor. The term "visitor" is defined as a person who was officially invited by the University for academic or research purposes and for a duration which has been agreed between both parties.[966] Where the intellectual property was created by a university visitor using the facilities, materials, funds or other resources provided or obtained by or through UUM, the university only requires the visitor to disclose to the University any intellectual property which the visitor has created and the University reserves its right to claim ownership or any other interests in the intellectual property.[967] Therefore, UUM does not claim ownership right by default, but merely reserves its right to claim the ownership. UUM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a non-employee university researcher.

UUM IP Policy provides that, the university shall claim ownership in the intellectual property for research data created by the UUM students using the facilities, materials, funds or other resources provided or obtained by or through UUM.[968] Through this provision, UUM IP Policy clarifies ambiguity about ownership of publicly funded research data created by a university student. Where the intellectual property is created under research collaboration, UUM IP Policy also provides that ownership of the intellectual property shall be governed in accordance to the agreement with the third party. Where there is a conflict on condition of ownership between the policy and the agreement entered with the third party, the agreement shall prevail. [969] Ownership of publicly funded research data created under research collaboration is not clear as it is subject to the agreement. UUM IP Policy does not clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

UPSI Guidelines provide that the university shall be the co-proprietor of the intellectual property created by a university employee using the University funds or facilities or equipment provided by or through the University.[970] The Guidelines

966 Ibid [4] Definition – Visitor.
967 Ibid [5(2)(b)] Ownership of Intellectual Property Rights – Visitor.
968 Ibid [5(2)(b)] Ownership of Intellectual Property Rights – Student.
969 Ibid [6(1)] The Intellectual Property Created Under Agreement with the Third Party.
970 Innovation and Commercialization Guidelines of UPSI, Ownership, [5.1.1].

further provide that a university employee will be the owner of the creation which has no connection with the employee's official duty and was developed without using the University facilities or equipments.[971] Based on the above provisions, UPSI Guidelines clarify ambiguity about ownership of publicly funded research data created by a university employee in and outside the course of employment.

Further, UPSI Guidelines provide that where the creation was developed by a researcher who is non-employee or a student of the university, but using the university facilities, ownership of the creation is subject to the agreement between both parties.[972] As the issue of ownership is to be decided by the parties in the agreement, UPSI Guidelines do not clarify ambiguity about ownership of publicly funded research data created by a non-employee researcher and a student of the University .

UPSI Guidelines are silent on the condition of ownership of intellectual property created by a university researcher under research collaboration. Therefore UPSI Guidelines do not clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

As for UPNM, so far there is no known existing policy dealing with ownership of research data. UPNM R&I Policy does not have a provision dealing with ownership of research data.

The policy analysis is illustrated in Table 6.2.2(a) to (b) below.

Table 6.2.2(a) Whether the policies clarify ambiguity about ownership of publicly funded research data created by a university employee in the course of employment?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	N/E*

971 Ibid [5.2] Ownership
972 Ibid [5.5] Ownership

Table 6.2.2(b) Whether the existing policies clarify ambiguity about ownership of publicly funded research data created by a university employee outside the course of employment?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	N/E*

Table 6.2.2(c) Whether the policies clarify ambiguity about ownership of publicly funded research data created by a non-employee university researcher?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	Yes	No	No	No	No	No	No	N/E*

Table 6.2.2(d) Whether the policies clarify ambiguity about ownership of publicly funded research data created by a university student?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
Yes	No	Yes	Yes	No	No	Yes	Yes	No	N/E*

Table 6.2.2(e) Whether the policies clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	Yes	Yes	No	No	No	No	No	N/E*

N/E* = there is no known existing policy of the university

From the above analysis it is found that legal impediments arising from ambiguity about ownership of research data have not been fully resolved by the existing policies of Malaysian public universities, since:

i) only 6 policies clarify ambiguity about ownership of publicly funded research data created by a university employee in the course of employment;

ii) only 6 policies clarify ambiguity about ownership of publicly funded research data created by a university employee outside the course of employment;

iii) only 1 policy clarifies ambiguity about ownership of publicly funded research data created by a non-employee university researcher;

iv) only 5 policies clarify ambiguity about ownership of publicly funded research data created by a university student; and

v) only 2 policies clarify ambiguity about ownership of publicly funded research data created by a university researcher under research collaboration with a non-university researcher.

6.2.3 Data Owner's Exclusive Rights in Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with a data owner's exclusive rights in research data. The objective of the analysis is to find out if the legal impediment arising from a data owner's exclusive rights in research data has been resolved by the existing polices of Malaysian public universities. To this end, the analysis shall determine whether the policies restrict a data owner's exclusive rights in publicly funded research data.

A. Policies of the Research University

UM IP Policy expressly recognises intellectual property rights as a legal right that enables the owners of intellectual property to exercise control over the exploitation of their intellectual property, usually for commercial purposes.[973] The policy also recognises that copyright ownership enables the copyright owner to control the copying, performance, communication and distribution of his work.[974] UM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

UKM IP Policy lists copyright granted under the *Malaysian Copyright Act* as one of the legal rights recognised by statutes.[975] According to the policy, Copyright is the

973 Intellectual Property Policy for UM 2010, Intellectual Property Rights, [2.4].

974 Ibid [3(2)(b)] Copyright.

975 UKM Intellectual Property Policy 2010, Definitions – legal rights, [2.3]. See also, Intellectual Property Rights- copyright, [3.1].

protection granted under the Copyright Act 1987 for original literary works, musical works, artistic works, film, sound recordings and broadcast. UKM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

UPM IP Policy recognises intellectual property as any information, idea, innovation, creative work, design, literature and other subject matters protected by the law or which gives rise to legal rights which are recognised by the law in Malaysia or abroad.[976] Further it is provided that the University upon advice from the University Intellectual Property Committee, may assign either in full or in part the intellectual property rights to a creator of the intellectual property.[977] UPM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

USM IP Policy provides that where the University is the owner of the intellectual property, the University through its Intellectual Property Management Committee, shall have the sole right to determine the disposition of the University's intellectual property, subject to any prior contractual obligations to external sponsors.[978] It is further provided in USM IP Policy that the University shall assign its rights to the originator in the event the Intellectual Property Management Committee decides that the University will not become involved in the commercialisation of the IP. [979] Under the policy, "originator" means a person and/or a team of persons who actually contribute(s) intellectually to an intellectual property and shall include an author, creator, designer or inventor of an intellectual property.[980] USM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

Under UTM IP Policy, where the University is the owner of the intellectual property, the University reserves the right, among others, to undertake the appropriate measures to protect the intellectual property, identification of potential licenses and the assignment of the right to a third party.[981] It is also provided in the policy that, in the event the University does not wish to commercialise the intellectual property, the

976 UPM Statute (Intellectual Property) 2003, Interpretation - intellectual property, [2].
977 Ibid [3(4)] Intellectual Property Ownership.
978 USM Intellectual Property Policy 2009, Preamble, [1.1.2]; Ownership of IP, [4.9].
979 Ibid [4.9] Ownership of IPR.
980 Ibid [2.0] Definition – originator.
981 Intellectual Property Policy of UTM 1999, Part 5.3(a), (b), (c) – Exploitation of Intellectual Property.

University shall assign its right of intellectual property ownership to the inventor.[982] UTM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

B. Policies of the Comprehensive University

UNIMAS IP Policy provides that the University may use any means whatsoever as it shall in its sole and absolute discretion deem fit, to protect any intellectual property owner, including, but not limited to, instituting proceedings concerning patent and license infringements.[983] In protecting its interests, the UNIMAS IP Policy empowers its IP Management and Commercialisation Unit to provide legal support to defend and protect the interests of the University and inventors of the intellectual property against third party claims or unauthorised use.[984] UNIMAS IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

C. Policies of the Focus University

UNIMAP IP Policy declares the protection of the rights of scholars to control the products of their scholarly works as part of the objectives of its IP policy.[985] The policy also requires consent of the originator of intellectual property to be obtained before any negotiation to exploit the intellectual property is made with the third party.[986] UNIMAP IP Policy does not restrict a data owner's exclusive rights in publicly funded research data.

UUM IP Policy recognises the owners' right to exercise their exclusive control over the exploitation of the intellectual property rights, in particular commercial aspects of it.[987] UUM IP Policy does not restrict a data owner's exclusive rights in publicly funded research data. UPSI Guidelines recognise copyright as an exclusive protection over the works categorised as copyright works under the Copyright Act

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982 Ibid.

983 UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006, Commercialisation and Protection, [6.3].

984 Ibid [2.2.1.5] Intellectual Property Management and Commercialisation Unit (IPMCU).

985 UNIMAP Intellectual Property Policy 2007, Objectives, [1].

986 Ibid [5(i)] Agreements with Third Party.

987 UUM Intellectual Property Policy, Intellectual Property Rights, [2].

1987.[988] UPSI Guidelines do not restrict a data owner from exercising their exclusive rights in publicly funded research data. Similarly, UPNM R&I Policy does not restrict a data owner's exclusive rights in publicly funded research data.

The policy analysis is illustrated in Table 6.2.3 below.

Table 6.2.3 Whether the policies restrict a data owner's exclusive rights in publicly funded research data?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	No

From the above analysis, it is found that the legal impediment arising from data owner's exclusive rights in research data has not been resolved by the existing policies of Malaysian public universities.

6.2.4 The Restrictive Scope of the Legitimate Use of Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with the scope of legitimate use of research data. The objective of the analysis is to find out if the legal impediment arising from the restrictive scope of the legitimate use of research data has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies allow the right to use publicly funded research data beyond fair dealing exceptions under the *Malaysian Copyright Act.*

A. Policies of the Research University

University of Malaya e-Print (UM e-Print) is an online institutional repository of the University's research output. UM e-Print is registered as open access repository under the Directory of Open Access Repositories ("OpenDOAR").[989] UM e-Print accepts published papers, research journal articles, unpublished pre-prints together

[988] Innovation and Commercialization Guidelines of UPSI, Definition – Copyright, [2].

[989] 'Directory of Open Access Repositories', <http://www.opendoar.org/countrylist.php?cContinent=Asia> (at 21 June 2010).

with working papers, technical reports, book chapters, and conference proceedings generated by the University. UM e-Print Policy provides that UM e-Print is open to all free of any charge, but information gathered from UM e-Print Repository may be re-used only for educational purposes and appropriate citation must be given to acknowledge the work of its original author. UM e-Print Policy also provides that the information should not be used for commercial purposes unless prior permission has been sought from the author.[990] UM e-Print Policy does not allow the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

Perpustakaan Tun Seri Lanang UKM Repository is an online institutional repository for UKM (UKM Repository). The UKM Repository is an open access repository registered under OpenDOAR.[991] The UKM Repository contains materials of academic output such as research and publication, which is related to the University. UKM Repository Policy provides that the documents held in its archive may be downloaded for personal, educational or other not-for-profit use. All other usage is prohibited without the explicit permission of the archive administrator.[992] UKM Repository Policy does not allow the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

UPM Institutional Repository (UPM Repository) is an online repository registered under OpenDOAR.[993] UPM Repository provides access to various types of University publications and documents, such as theses, articles and conference papers. Despite the fact that the UPM Repository is listed as an open access repository under OpenDOAR, UPM Repository Policy does not permit users to view the full text and access is only given to the content pages and abstracts of the thesis.[994] UPM Repository Policy does not allow the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

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990 'UM Research Repository ' *University of Malaya*, <http://eprints.um.edu.my/guide.html> (at 21 June 2010).

991 'Directory of Open Access Repositories', above n 989.

992 'Directory of Open Access Repositories', <http://www.opendoar.org/find.php?format=full&search=PTSL UKM Repository&title=SUPPRESS> (at 21 June 2010).

993 'Directory of Open Access Repositories', above n 989.

994 'Perpustakaan Sultan Abdul Samad Institutional Repository' *Universiti Putra Malaysia*, <http://www.psasir.upm.edu.my/> (at 21 June 2010).

USM Open Access Repository (USM Repository) is an online institutional repository which is registered under OpenDOAR.[995] USM Repository Policy allows the schools, academic staff, students or project staff of USM to submit their article, book, conference volume, paper or presentation at a conference, workshop or other event, as well as a monograph or thesis and dissertation in its Repository.[996] While USM Repository Policy allows public access to its repository contents, it does not clarify the scope of the legitimate use of the repository contents.[997] As the scope of the legitimate use of the repository contents is not clarified by USM Repository Policy, the public does not have the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

UTM Institutional Repository (UTM Repository) is an online institutional repository which is registered under OpenDOAR.[998] The UTM Repository allows public access to full items of the repository materials free of charge. However, the UTM Repository does not clarify the scope of the legitimate use of its repository materials. As the scope of the legitimate use of the repository materials is not clarified by UTM Repository Policy, the public does not have the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

B. Policies of the Comprehensive University

MARA University of Technology (UiTM) is the only comprehensive university which has an institutional repository registered under OpenDOAR.[999] The UiTM Repository contains among others, articles, books, conference or workshop items, monographs, theses and videos.[1000] However, UiTM Repository does not have a policy which clarifies the scope of the legitimate use of its repository contents. Since the scope legitimate use of UiTM Repository contents is not clarified, the public

995 'Directory of Open Access Repositories', above n 989.

996 Open Access Repository of USM Research & Publication: Submission Guidelines.

997 'Universiti Teknologi Malaysia Institutional Repository ' (2010) *Directory of Open Access Repositories*, <http://www.opendoar.org/find.php?format=full&search=Universiti Teknologi Malaysia Institutional Repository&title=SUPPRESS> (at 21 June 2010).

998 'Directory of Open Access Repositories', above n 989.

999 Ibid.

1000 'Institutional Repository Perpustakaan Tun Abdul Razak' (2011) *MARA University of Technology*, <http://eprints.ptar.uitm.edu.my/> (at 12 June 2011).

does not have the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

C. Policies of the Focus University

UNIMAP Library Digital Repository (UNIMAP Repository) is an institutional repository registered under OpenDOAR. UNIMAP Repository is the repository which stores, preserves, archives and facilitates access to scholarly digital contents produced by the academician, researchers and administrators of the University.[1001] UNIMAP Repository contains among others journal articles, conference papers and university theses and is accessible to the public. The UNIMAP Repository also does not have a policy which clarifies the scope of the legitimate use of its repository contents. As the scope of the legitimate use of UNIMAP Repository contents is not clarified, the public does not have the right to use beyond fair dealing exceptions provided under the *Malaysian Copyright Act*.

UUM Repository is an online institutional repository registered under OpenDOAR.[1002] UUM Repository holds all types of materials, which may include working drafts, submitted versions of articles for peer review, as well as the final drafts of peer review publications.[1003] UUM Repository Policy provides that anyone may access full text or other full data items free of charge. The user may also reproduce, display, or perform the text or data in any format or medium, without prior permission or charge, provided it is for personal research or study, educational, or non-profit purposes.[1004] UUM Repository Policy does not allow the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

UPSI Digital Collections (UPSI Repository) is an online repository which provides free access to digital contents such as research papers, thesis, examination papers and

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1001 'UNIMAP Library Digital Repository' (2007) *Universiti Malaysia Perlis*, <http://dspace.unimap.edu.my/dspace/> (at 16 August 2011).

1002 'Directory of Open Access Repositories', above n 989.

1003 'UUM Repository Policies' (2010) *Universiti Utara Malaysia*, <http://eprints.uum.edu.my/policies.html> (at 21 June 2010).

1004 Ibid.

proceeding papers.[1005] The UPSI Repository is not registered as an open access repository under OpenDOAR.[1006] The UPSI Repository does not have a policy which clarifies the scope of the legitimate use of its repository materials. As there is no policy which clarifies the scope of the legitimate use of UPSI Repository, the public does not have the right to use beyond fair dealing exceptions under the *Malaysian Copyright Act*.

As for the focus university specialises in defence, the latest survey on the UPNM official website found that the University is yet to have its own institutional or departmental repository.[1007] Therefore, UPNM has no known existing policy dealing with the scope of the legitimate use of research data.

The policy analysis is illustrated in Table 6.2.4 below.

Table 6.2.4 Whether the policies allow the right to use publicly funded research data beyond fair dealing exceptions?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UiTM	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	N/E*

N/E* = there is no known existing policy of the university

From the analysis, it is found that the legal impediment arising from the restrictive scope of the legitimate use of research data has not been resolved by the existing policies of Malaysian public universities.

6.2.5 Complex and Lengthy Copyright Licensing Procedures for Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with copyright licensing procedures for research data. The objective of the analysis is to find out if the legal impediment arising from complex and lengthy licensing procedures for research data has been resolved by the existing policies of Malaysian

[1005] 'UPSI Digital Collections' (2011) *Universiti Pendidikan Sultan Idris*, <http://pustaka.upsi.edu.my/web/guest/home> (at 16 August 2011).

[1006] Ibid.

[1007] 'Background' (2011) *National Defence University of Malaysia*, <http://www.upnm.edu.my/en/index.php?req=7> (at 16 August 2011).

public universities. To this end, the analysis shall determine whether the policies require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

A. Policies of the Research University

UM IP Policy empowers the Intellectual Property Committee of the University to identify potential licensees and assign the intellectual property rights to third parties.[1008] UM IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

UKM IP Policy entrusted UKM Centre for Collaborative Innovation with the responsibility to deal with technology licensing negotiations and licensing agreements for the purpose of commercialisation of the University's intellectual property.[1009] UKM IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research to be adopted.

Under UPM IP Policy, an Intellectual Property Management Committee (IPMC) was established which has the power to advise the Vice-Chancellor of the University with regard to negotiation and licensing of the University's intellectual property rights.[1010] UPM IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

USM IP Policy provides that the University's IPMC shall have the sole right to determine the disposition of the University intellectual property, but it is subject to any prior contractual obligations to external sponsors.[1011] USM IP Policy further provides that the University may conclude an agreement with a third party to exploit the intellectual property owned by the University.[1012] USM IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

1008 Intellectual Property Policy for UM 2010, Management of IPR, [7.7].
1009 UKM Intellectual Property Policy 2010, Management and Commercialisation of IPR, [6.2(b)].
1010 UPM Statute (Intellectual Property) 2003, Intellectual Property Committee, [5(3)(e)].
1011 USM Intellectual Property Policy 2009, Ownership of IP, [4.11].
1012 Ibid [5.3] Agreement With Third Parties.

UTM IP Policy entrusted the University's IPMC with the power to identify the potential licensee and assign the intellectual property for the purpose of commercial exploitation of the same.[1013] UTM IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

B. Policies of the Comprehensive University

UNIMAS IP Policy empowers the University to assign rights and grant licenses, whether exclusive or not, with respect to the intellectual properties in order to facilitate technology transfer while protecting the rights of the University and the Inventors.[1014] UNIMAS IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

C. Policies of the Focus University

Under UNIMAP IP Policy, the University's IPMC, which has been given the responsibility in the management of intellectual property rights, will undertake a licensing process where a decision has been made by the University to commercialise the intellectual property.[1015] Under UNIMAP IP Policy, the University's IPMC is only responsible for commercial licensing of the University intellectual property. UNIMAP IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

In UUM IP Policy, the University's IPMC is required to take all necessary and reasonable actions to commercialise or exploit the University's intellectual property, which includes identifying potential licensees of the intellectual property.[1016] UUM

1013 Intellectual Property Policy of UTM 1999, Part 5, Exploitation of Intellectual Property, [5.3(b)]-[5.3(c)].

1014 UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006, Intellectual Property Ownership by the University, [3.1.1].

1015 UNIMAP Intellectual Property Policy 2007, Management of IPR, [6.v].

1016 UUM Intellectual Property Policy, Management of IP, [7(7)(a) – 7(7)(c).

IP Policy does not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

Similarly, UPSI Guidelines empower the University's Innovation and Commercialisation Committee to make a recommendation on the exploitation of the University's intellectual property.[1017] UPSI Guidelines do not require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted.

It is found that there is no known existing policy of UPNM dealing with licensing procedures for research data. In the absence of the existing policy, UPNM policy on licensing procedures for research data is not available for analysis.

The policy analysis is illustrated in Table 6.2.5 below.

Table 6.2.5 Whether the policies require licensing procedures which simplify open access to and re-use of publicly funded research data to be adopted?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	N/E*

N/E* = there is no known existing policy of the university

From the above analysis, it is found that the legal impediment arising from complex and lengthy licensing procedures for research data has not been resolved by the existing policies of Malaysian public universities.

6.2.6 Author's Moral Right of Integrity

Analysis is made of the existing policies of Malaysian public universities dealing with author's moral rights. The objective of the analysis is to find out if the legal impediment arising from author's moral right of integrity has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

[1017] Innovation and Commercialization Guidelines of UPSI, Commercialisation Procedures, [3.2].

A. Policies of the Research University

UM IP Policy contains a provision dealing with author's moral rights. UM IP Policy provides that the university shall take reasonable steps to ensure that the researcher is acknowledged as the creator or originator of the intellectual property. Reasonable steps shall also be taken to ensure that any alteration or modification of a work does not harm the reputation or honour of the creator or originator.[1018] UM IP Policy does not reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

In UKM IP Policy, "Moral Rights" have been defined as the rights given to an author of copyright works to protect the personal and reputational value of the works.[1019] Further according to UKM IP Policy, this right includes the right to protect against any changes made to the name of the creator of the works, distortion, mutilation, or other modifications to the works so as to affect the creator's honour or reputation.[1020] UKM IP Policy does not reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

UTM IP Policy provides that the university shall take reasonable steps to respect the right of an originator to be acknowledged as the creator of intellectual property, and to endeavour to ensure that others respect that right. UTM Policy also provides an undertaking by the university, where the university itself uses intellectual property created by an originator, it shall take reasonable steps to consult with the originator before modifying or adapting that intellectual property.[1021] UTM IP Policy does not reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

Both USM and UPM do not have any known existing policies dealing with an author's moral rights.

1018 Intellectual Property Policy for UM 2010, Moral Rights and Ethical Issues, [10(1)]
1019 UKM Intellectual Property Policy 2010, Definitions – Moral Rights, [2].
1020 Ibid [2] Definitions
1021 Intellectual Property Policy of UTM 1999, Moral Rights, [7.1].

B. Policies of the Comprehensive University

UNIMAS does not have any known existing policy dealing with an author's moral rights.

C. Policies of the Focus University

UNIMAP IP Policy provides that copyright protection also includes moral rights, comprising the right to claim authorship of a work, and the right to oppose changes to it that could harm the creator's reputation.[1022] UNIMAP IP Policy provides that the university shall take reasonable steps to respect the right of an originator to be acknowledged as the creator of intellectual property, and they endeavour to ensure that others respect that right.[1023] It is found that UNIMAP IP Policy does not reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

UUM IP Policy also recognised an author's moral rights. UUM Policy provides that the university shall take reasonable steps to ensure that any alteration or modification to the work shall not adversely impact the reputation and honour of the creator or originator of the intellectual property.[1024] UUM IP policy does not reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

Two other focus universities, UPSI and UPNM, do not have any known existing policies dealing with author's moral rights.

The policy analysis is illustrated in Table 6.2.6 below.

[1022] UNIMAP Intellectual Property Policy 2007, Coverage of Intellectual Property Policy – copyrights, [3(E)].
[1023] Ibid [8.i] Moral Rights.
[1024] UUM Intellectual Property Policy, Moral Rights and Ethical Issues, [10].

Table 6.2.6 Whether the policies reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	N/E	N/E	No	N/E	No	No	N/E*	N/E*

N/E* = there is no known existing policy of the university

From the above analysis, it is found that the legal impediment arising from an author's moral right of integrity has not been resolved by the existing policies of Malaysian public universities.

6.2.7 Non-Disclosure Duty of Confidential Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with non-disclosure duty of confidential research data. The objective of the analysis is to find out if the legal impediment arising from non-disclosure duty of confidential research data has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

A. Policies of the Research University

UM IP Policy defines "confidential information" as information of a confidential nature which has not been made public. According to the policy, confidential information covers all information such as trade secrets, personal secrets, literary, scientific or artistic secrets, and public and government secrets.[1025] UM IP Policy provides that all employees of the university shall ensure that in the creation, development and generation of any intellectual property, all reasonable care should be taken to ensure that there is no breach of any ethics or guidelines established by the university in relation to data storage and confidentiality.[1026] UM IP Policy also provides that where an information is imparted or disclosed in confidence there is an

[1025] Intellectual Property Policy for UM 2010, Confidential Information, [3(6)(a)].
[1026] Ibid [10(2)] Moral Rights and Ethical Issues.

obligation on the recipient not to reveal or use the information. The obligation arises regardless of whether or not the disclosure was made pursuant to a non-disclosure or confidentiality agreement.[1027] UM IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

Under UKM IP Policy, "confidential information" refers to information that is confidential in nature i.e. information that has not been made public. It covers all information such as trade secrets, personal secrets, organisational secrets, government secrets and scientific secrets. UKM IP Policy provides that the obligation to keep the information secret arises when the information is disclosed in confidence regardless of whether or not the disclosure was made in breach of a confidentiality agreement.[1028] UKM IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

UPM IP Policy defines "confidential information" as any information including information which has commercial or technical value that, due to its confidential character, requires protection by way of contract, equity or other legal methods.[1029] UPM IP Policy recognises as intellectual property any information communicated in a way which gives rise to the obligation of confidentiality, trade secret and information subject to an employee's duty of fidelity to the employer.[1030] Further, UPM Research Policy provides that if confidential data is found, for instance an individual record of a patient or a particular survey form, the confidentiality must be preserved and the researchers are not allowed to utilise such information for personal or third party use.[1031] Both UPM IP Policy and UPM Research Policy do not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

1027 Ibid [3(6)(b)] Confidential Information.
1028 UKM Intellectual Property Policy 2010, Confidential Information, [3.8].
1029 UPM Statute (Intellectual Property) 2003, Confidential Information – interpretation, [2].
1030 Ibid [2] Intellectual Property – interpretation.
1031 UPM Research Policy 2009, Ethical Conduct in Research Involving Humans, [2.2.1.a); Ethical Conduct in Research – general, [2.1.c].

USM IP Policy requires information communicated in a way to cause a duty of confidentiality to be protected as intellectual property. [1032] USM IP Policy defines "confidential information" as information of a confidential nature which has not been made public. It covers all information such as business secrets, personal secrets, literary, scientific or artistic secrets, and public and government secrets.[1033] USM IP Policy provides that, where such information is imparted or disclosed in confidence, there is an obligation on the recipient not to reveal or use the information. Such obligation arises regardless of whether or not the disclosure was made pursuant to a non-disclosure or confidentiality agreement.[1034] USM IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

UTM IP Policy has listed confidential information and trade secrets including background and foreground information as part of intellectual property.[1035] UTM IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

B. Policies of the Comprehensive University

UNIMAS IP Policy defines "confidential information" as any intellectual property, information or data of a confidential nature, including all oral and visual information or data, all information or data recorded in writing or in any other medium or by any other method, and all intellectual property, information and data which the University is under obligation, whether contractual or otherwise, not to divulge.[1036] UNIMAS IP Policy provides as part of its general policy that all staff members and/or students shall at all times keep confidential all confidential information, whether it is made/developed on their own or in collaboration with University colleagues.[1037] The non-disclosure duty of confidential information can also be found in UNIMAS Research Policy, whereby the policy describes abuse of confidentiality

1032 USM Intellectual Property Policy 2009, Definition – IP, [2.0].
1033 Ibid [3.10.1] Confidential Information.
1034 Ibid [3.10.2] Confidential Information.
1035 Intellectual Property Policy of UTM 1999, Part 2 Definitions – Intellectual Property.
1036 UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006, Definitions – Confidential Information, [1.3].
1037 Ibid [1.3] Definitions – confidential information; [9.1.1] Confidentiality.

as taking or releasing ideas or data that was shared with the legitimate expectation of confidentiality.[1038] UNIMAS Research Policy treats abuse of confidentiality both as research misconduct and a very serious offence which is subject to strict disciplinary action.[1039] Both UNIMAS IP Policy and UNIMAS Research Policy do not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

C. Policies of the Focus University

UNIMAP IP Policy classifies confidential data, information or compilations used in research, business, commerce or industry as part of trade secrets which are protected as intellectual property. UNIMAP IP Policy provides that the information may include confidential and technical data and business, commercial or financial information not publicly known that is useful to an enterprise and confers competitive advantage on one having a right to use it. UNIMAP IP Policy requires the secrecy of the information to be maintained, to conserve its trade secret status.[1040] In protecting confidential information, the policy acknowledges that some universities may have reservations regarding its protection, as it is hard to reconcile its protection with openness in knowledge sharing, which is part of the academic mission.[1041] Despite the above acknowledgment, UNIMAP IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

UUM IP Policy defines "confidential information" as information which is confidential in nature and which is unknown to the public. It covers all types of information such as trade secrets, personal secrets, literary, scientific or artistic secrets, and national and Government secrets.[1042] UUM IP Policy provides that where the confidential information was imparted or disclosed in confidence, it is the duty of the recipient not to disclose or use the information. The policy further provides that the duty exists regardless whether the information is disclosed pursuant

1038 Ibid [14.6] Research Misconduct.
1039 Ibid [14.1] Research Misconduct.
1040 UNIMAP Intellectual Property Policy 2007, Coverage of Intellectual Property Policy, [3.F(i)].
1041 Ibid [3.F(iv)] Coverage of Intellectual Property Policy.
1042 UUM Intellectual Property Policy, Confidential Information, [3(6)(a)].

to a non-disclosure agreement or confidential agreement. [1043] UUM IP Policy does not balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data.

There is no known existing policy of UPSI and UPNM dealing with non-disclosure duty of confidential research data that is available for analysis.

The policy analysis is illustrated in Table 6.2.7 below.

Table 6.2.7 Whether the policies balance non-disclosure duty with the objective of enabling open access to and re-use of publicly funded research data?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	N/E*	N/E*

N/E* = there is no known existing policy of the university

From the above analysis, it is found the legal impediment arising from non-disclosure duty of confidential research data has not been resolved by the existing policies of Malaysian public universities.

6.2.8 The Right to Informational Privacy of Subjects of Research Data

Analysis is made of the existing policies of Malaysian public universities dealing with the right to informational privacy of subjects of research data. The objective of the analysis is to find out if the legal impediment arising from the right to informational privacy of subjects of research data has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

A. Policies of the Research University

UM Privacy Policy requires all research surveys conducted on-line by University staff and/or students that involve the collection of personal information to receive

[1043] Ibid [3(6)(b)] Confidential Information.

approval from the University's Committee for Human Ethics in Research. UM Privacy Policy also makes it clear that the University will not disclose personal information to parties outside the University. [1044] UM Privacy Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

UKM Privacy Policy is only applicable to the visitors of the University website. The policy states that no personally identifiable information is gathered during the browsing of the University website except for information given by the visitors through e-mail.[1045] UKM Privacy Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

UPM Research Policy requires university researchers to respect human dignity, privacy and confidentiality in accordance to the World Health Organization's ethical guidelines.[1046] UPM Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

USM Privacy Policy is limited to use and disclosure of personal information collected from visitors to the University website.[1047] Therefore, USM Privacy Policy does not balance right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

In UTM, the right to informational privacy is dealt with through UTM Web Policy.[1048] UTM Web Policy provides that where the photographer has been commissioned to take private or domestic photos, then the person who commissioned them has the right to prevent copies being issued to the public. UTM Web Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

1044 UM Privacy Policy.
1045 UKM Privacy Policy.
1046 UPM Research Policy 2009, Ethical Conduct in Research Involving Humans, [2.2.1.a].
1047 USM Privacy Policy.
1048 UTM Web Policy.

B. Policies of the Comprehensive University

UNIMAS Research Policy provides that the University's researchers are bound by all legal requirements which regulate their work including on the issue of privacy and protection of research data.[1049] UNIMAS Research Policy further provides that failure to protect the privacy rights of informants and the research subject's anonymity and confidentiality of information sources shall amount to grave research misconduct.[1050] UNIMAS Research Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

C. Policy of the Focus University

UUM Privacy Policy sets out the privacy practices for the services offered on any UUM owned and/or operated websites. The policy expressly states that the University believes strongly in protecting users' privacy and will not wilfully disclose information about users to any third party without first receiving the users' consent.[1051] UUM Privacy Policy does not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

A similar situation could be observed in the privacy policy of other focus universities. UNIMAP Privacy Policy,[1052] UPSI Privacy Policy, [1053] and UPNM Privacy Policy, [1054] protect the right to informational privacy limited to visitors of their websites. All these policies do not balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data.

The policy analysis is illustrated in Table 6.2.8 below.

1049 UNIMAS Research Policy (Version 7.0) 2006, Research Ethics, [13.10].
1050 Ibid [14.10] Research Misconduct.
1051 UUM Privacy Policy.
1052 UNIMAP Privacy Policy.
1053 UPSI Privacy Policy.
1054 UPNM Privacy Policy.

Table 6.2.8 Whether the policies balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data?

Public Research Universities					Public Non-Research Universities				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	No

From the above analysis, it is found that the legal impediment arising from the right to informational privacy of subjects of research data has not been resolved by the existing policies of Malaysian public universities.

6.2.9 Protection of National Security

Analysis is made of the existing policies of Malaysian public universities dealing with the protection of national security. The objective of the analysis is to find out if the legal impediment arising from the protection of national security has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies provide the classification of research data of which disclosure is prejudicial to national security.

A. Policies of the Research University

UM Research Repository Policies list national security as among the acceptable reasons for withdrawal of repository items at the request of the author/copyright holder.[1055] UM Research Repository Policies do not provide the classification of research data of which disclosure is prejudicial to national security.

UPM Institutional Repository Policies also list national security as an acceptable reason for withdrawal, where the author/copyright holder may request the removal of repository items.[1056] UPM Institutional Repository Policies do not provide the classification of research data of which disclosure is prejudicial to national security.

[1055] UM Research Repository Policies.
[1056] UPM Institutional Repository Policies.

Three other public research universities i.e. UKM, USM and UTM do not have a policy dealing with the protection of national security.

B. Policies of the Comprehensive University

So far there is no known existing policy of comprehensive universities dealing with the protection of national security that is available for analysis.

C. Policies of the Focus University

UUM Repository Policies list national security as among the acceptable reasons for withdrawal of repository items.[1057] UUM Repository Policies do not provide the classification of research data of which disclosure is prejudicial to national security.

Apart from UUM, other focus universities do not have any known existing policy dealing with the protection of national security.

The policy analysis is illustrated in Table 6.2.9 below.

Table 6.2.9 Whether the policies provide the classification of research data of which disclosure is prejudicial to national security?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	N/E*	No	N/E*	N/E*	N/E*	N/E*	No	N/E*	N/E*

N/E* = there is no known existing policy of the university

From the above analysis, it is found that the legal impediment arising from the protection of national security has not been resolved by existing policies of Malaysian public universities.

[1057] UUM Repository Policies, above n 1003.

6.2.10 Novelty Requirements in Patent Law

Analysis is made of the existing policies of Malaysian public universities dealing with the novelty requirements in patent law. The objective of the analysis is to find out if the legal impediment arising from novelty requirements in patent law has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies have fixed a timeframe for the patent application to be filed.

A. Policies of the Research University

UM IP Policy prohibits publication or announcement, where the intellectual property involved an invention or design, until a decision whether or not to exploit the invention or design has been made.[1058] UM IP Policy has not fixed a timeframe for the patent application to be filed. In UKM IP Policy, the creator or originator of patent and industrial design is required by the Policy to consult with UKM representatives before any publication, announcement or exhibition involving the intellectual property is made.[1059] Where UKM decides to commercialise the University intellectual property, it shall implement its decision in a timely manner to register the intellectual property under its name.[1060] UKM IP Policy has not fixed a timeframe for the patent application to be filed.

UPM IP Policy prohibits the inventor from disclosing the intellectual property without first making a written submission to the University on the nature and creation of the intellectual property.[1061] UPM IP Policy also imposes an obligation on the inventor (whether employees or students) not to make a public disclosure pertaining to the University intellectual property without prior written consent from the Vice Chancellor.[1062] It is also provided in UPM IP Policy that the Vice Chancellor is required to immediately inform the creator of the intellectual property of the advice received from the University's IPC, which may include advice as to

1058 Intellectual Property Policy for UM 2010, Management of IPR, [7.5].
1059 UKM Intellectual Property Policy 2010, Management and Commercialization of IPR, [6.5].
1060 Ibid Clause 6.6 – Management and Commercialization of IPR.
1061 UPM Statute (Intellectual Property) 2003, Disclosure of Intellectual Property, [4.1].
1062 Ibid [3(4)(b)] Ownership of IP.

whether or not to patent the invention. [1063] UPM IP Policy has not fixed timeframe for the decision whether or not a patent of the invention is to be made. Similarly, UPM IP Policy has not fixed a timeframe for the patent application to be filed.

USM IP Policy empowers the university's IPMC to decide whether or not to exploit the relevant intellectual property. [1064] USM IP Policy also empowers its IPMC to determine a time when publication of the information may take place in order for the intellectual property to be protected or successfully exploited. USM IP Policy however provides that in determining the appropriate time for publication of information, regard should be taken to the principle that the University shall not unduly delay the publication and intellectual dissemination of the University's intellectual property.[1065] USM IP Policy has not fixed a timeframe for the patent application to be filed.

UTM IP Policy empowers its IPMC to determine whether or not to exploit the invention and to take the necessary steps to protect the invention. UTM IP Policy has not fixed a timeframe for the patent application to be filed.

B. Policies of the Comprehensive University

UNIMAS Research Policy requires the inventor to keep confidential the details of the invention at all times, in particular during the period when the IP Commercialisation Committee is assessing the viability of commercialisation and/or patenting the invention. UNIMAS IP Policy provides that any publication or verbal disclosure which describes an invention prior to filing for a patent may jeopardise the patenting process.[1066] The Committee through its IPMC Unit is given six (6) months from the date of receipt of the Disclosure and Record of Invention Form from the inventor, to confirm in writing to the Inventor(s) whether or not the University would be pursuing the commercialisation and/or patenting of the Intellectual Property.[1067] In deciding whether or not to patent, the UNIMAS IP

1063 Ibid [5(4)] The Intellectual Property Committee.
1064 USM Intellectual Property Policy 2009, Publication, [6.0].
1065 Ibid [8.5] Commercial Exploitation.
1066 UNIMAS Research Policy (Version 7.0) 2006, Disclosure and Evaluation Processes, [4.7].
1067 Ibid [4.3].

Management and Commercialisation Policy further provides that the IPMC will not seek patent protection for inventions that are not commercially attractive, even though the invention may be scientifically meritorious.[1068] Compared to other universities, UNIMAS IP Policy has fixed a timeframe for the decision whether or not to patent the invention. However, where a decision to file a patent has been made, UNIMAS IP Policy has not fixed a timeframe for the patent application to be filed.

C. Policies of the Focus University

UNIMAP IP Policy provides that where the intellectual property involves an invention or a design, no publication or announcement regarding the intellectual property shall be made until a decision has been taken whether or not to exploit the relevant intellectual property.[1069] To avoid the risk of premature disclosure, UNIMAP IP Policy requires the researcher to inform the University's IPMC of any publications, or planned publications that disclose the invention. The disclosure of the invention will determine the timeframe for filing a patent application if a decision is made to do so. For the purpose of disclosure by way of publications it includes abstracts, poster sessions, shelved theses or talks describing an invention to an open audience. [1070] UNIMAP IP Policy further provides that the University would discourage agreements which withhold or unduly delay publication of research results. The IPMC and the inventor can cooperate through appropriate timing of disclosure, patent filing and publication to preserve commercial value and to meet any obligations to the sponsor, without hindering dissemination of research results.[1071] UNIMAP IP Policy has not fixed a timeframe for the patent application to be filed.

UUM IP Policy provides that where the intellectual property is an invention or a design, no publication or announcement pertaining to the intellectual property shall be made until a decision whether or not to exploit the intellectual property has been

[1068] Ibid [4.4].
[1069] UNIMAP Intellectual Property Policy 2007, Management of IPR, [6.v].
[1070] Ibid [13.i] Risk of Premature Disclosure.
[1071] Ibid [13.i] – [13.ii].

made.[1072] UUM IP Policy empowers the University's IPMC to make recommendation to the Permanent Committee on Finance whether or not to exploit the intellectual property, which was brought to the Committee's notice. [1073] UUM IP Policy has not fixed a timeframe for the patent application to be filed.

UPSI Guidelines state that an invention is not novel if it was disclosed or used prior to patent application.[1074] In relation to this, UPSI Guidelines prohibit any publication or announcement on any invention until the patent registration has been completed or until the University decides not to register the patent under the University's name or until the ownership of the invention is assigned to the inventor.[1075] Under UPSI Guidelines, the decision whether or not to patent the invention shall be made by the University Permanent Committee on Finance based on the recommendation made by the University's Innovation and Commercialisation Committee. [1076] UPSI Guidelines have not fixed a timeframe for the patent application to be filed.

There is no known existing policy at UPNM dealing with the novelty requirements in patent law.

The policy analysis is illustrated in Table 6.2.10 below.

Table 6.2.10 Whether the policies have fixed a timeframe for the patent application to be filed?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UNIMAP	UUM	UPSI	UPNM
No	No	No	No	No	No	No	No	No	N/E*

N/E* = there is no known existing policy of the university

From the above analysis, it is found that the legal impediment arising from the novelty requirements in patent law has not been resolved by the existing policies of Malaysian public universities.

1072 UUM Intellectual Property Policy, The Intellectual Property Management, [7.5].
1073 Ibid [7.4].
1074 Innovation and Commercialization Guidelines of UPSI, Interpretation – Patent, [2].
1075 Ibid [6.3] the Inventor's Action.
1076 Ibid [7.2 - 7.3] Action by University's Authority.

6.2.11 Lack of a Legal Duty to Ensure Data Quality

Analysis is made of the existing policies of Malaysian public universities dealing with data quality. The objective of the analysis is to find out if the legal impediment arising from lack of a legal duty to ensure data quality has been resolved by the existing policies of Malaysian public universities. To this end, the analysis shall determine whether the policies have developed a standard of care on open access data providers to ensure data quality.

A. Policies of the Research University

In terms of data quality, UM Research Repository Submission Policy provides that the submitted items are not vetted by the administrator and the validity and authenticity of the content of submissions is the sole responsibility of the depositor. Further, UM R&D Policy provides that the university is committed to the highest standard of accountability and integrity in research practices.[1077] None of the policies has developed a standard of care on open access data providers to ensure data quality.

UPM Repository Policy contains a submission policy which governs the quality of submitted content. UPM Repository Policy provides that the validity and authenticity of the content of submissions is checked by internal subject specialists.[1078] Besides its repository policy, UPM Research Policy requires the researcher to be responsible to any research output made through any form of dissemination method.[1079] None of the policies has developed a standard of care on open access data providers to ensure data quality.

Three others public research universities i.e. UKM, USM and UTM have no known existing policies dealing with data quality.

1077 UM Research and Development Policy 2002, Code of Conduct for Research, [6].
1078 UPM Institutional Repository Policies, Submission Policy, [6].
1079 UPM Research Policy 2009, Dissemination of Research Outputs, [6.6(c)].

B. Policies of the Comprehensive University

UNIMAS Research Policy expects university researchers to publish/exhibit their research findings with full responsibility and with an awareness of the consequences of any such dissemination in the public realm.[1080] UNIMAS Research Policy requires the researchers to emphasise high quality research, undertake appropriate research supervision and maintain accurate and detailed research activity records and results.[1081] UNIMAS Research Policy also requires the researchers who publish or disseminate their research or research findings in publications, conferences or on websites, to make every effort to ensure that their research or research findings are peer reviewed before it is published. If research is published or disseminated before any peer review has been undertaken, this must be made clear by the researcher.[1082] Compared to other public universities, UNIMAS Research Policy has developed a standard of care for University researchers who conduct, publish or disseminate their research findings. As the standard of care is only imposed on university researchers but not on other open access data providers (such as the University and Repository Centres), the legal impediment arising from lack of a legal to ensure data quality by UNIMAS Research Policy has not been fully resolved.

C. Policies of the Focus University

University of Technical Malaysia Melaka Research Policy 2006 (UTEM Research Policy) and University of Malaysia Pahang Research Policy (UMP Research Policy) impose on the principal investigators and senior faculty special responsibilities to assure overall cohesiveness and validity of the publications on which they appear as co-author.[1083] The research policies of both universities also require all authors in the research group to have a shared responsibility for the published result and should have the opportunity to review all sample preparation procedures and data, as well as all data acquisition and analysis procedures.[1084] Based on the above provisions,

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1080 UNIMAS Research Policy (Version 7.0) 2006, Publication and Dissemination of Research, [18.1].

1081 UNIMAS Research Policy (Version 7.0) 2006, Research Ethics, [13.4].

1082 Ibid [18.3] Publication and Dissemination of Research.

1083 See UTEM Research Policy 2006, Multi-Authored Research Papers, [4.2(i)]; UMP Research Policy, Multi-Authored Research Papers, [6.2(i)].

1084 See, Ibid [4.2(ii)]; See also, Ibid [6.2(ii)].

UTEM Research Policy and UMP Research Policy have developed a standard of care to ensure data quality, which is imposed on university researchers who publish their research results. As the standard of care is only imposed on university researchers and is limited to published research results, the legal impediment arising from lack of a legal duty to ensure data quality has not been fully resolved by the existing policies of UTEM and UMP.

UUM Institutional Repository Policies provide that the validity and authenticity of the content of submissions is the sole responsibility of the depositor. UUM Repository Policies have not developed a standard of care on open access data providers to ensure data quality.[1085]

Two other focus universities, UPSI and UPNM do not have any known existing policies dealing with data quality.

The policy analysis is illustrated in Table 6.2.11 below.

Table 6.2.11 Whether the policies have developed a standard of care on open access providers to ensure data quality?

Public Research Universities					**Public Non-Research Universities**				
					CompU	TechU	MgtU	EduU	DefU
UM	UKM	UPM	USM	UTM	UNIMAS	UTEM/UMP	UUM	UPSI	UPNM
No	N/E*	No	No	N/E*	Yes	Yes	No	N/E*	N/E*

N/E* = there is no known existing policy of the university

From the above analysis it is found that, with the exception of UNIMAS, UTEM and UMP policies which partially resolved the legal impediment, the existing policies of Malaysian public universities have not resolved the legal impediment arising from lack of duty of a legal duty to ensure data quality.

6.3 SUMMARY

From the above policy analysis, it found that nine out of 11 legal impediments which exist under the Malaysian laws have not been resolved by any of the existing

[1085] UUM Repository Policies, Submission Policy, [4].

policies of Malaysian public universities. Two other legal impediments (i.e. ambiguity about ownership of research data and lack of a legal duty to ensure data quality) to a certain extent have been resolved by one or more existing policies of Malaysian public universities.

The summary of the above findings is illustrated in Table 6.3.1 below.

Table 6.3.1 Have the legal impediments that exist under the Malaysian laws been resolved by the existing policies of Malaysian public universities?

	THE LEGAL IMPEDIMENTS	FINDINGS
1	Intellectual property protection of research data	Not resolved
2	Ambiguity about ownership of research data	Not fully resolved.
3	Data owner's exclusive rights tin research data	Not resolved
4	The restrictive scope of the legitimate use of research data	Not resolved
5	Complex and lengthy licensing procedures for research data	Not resolved
6	Author's moral right of integrity	Not resolved
7	Non-disclosure duty of confidential research data	Not resolved
8	The right to informational privacy of subjects of research data	Not resolved
9	Protection of national security	Not resolved
10	Novelty requirements in patent law	Not resolved
11	Lack of a legal duty to ensure data quality	Not fully resolved.

The legal impediment arising from ambiguity about ownership of research data has not been fully resolved by the existing policies of Malaysian public universities as only one policy (i.e. UPM IP Policy) clarifies all five areas of ambiguity about ownership of publicly funded research data. Two existing policies (of UKM and UNIMAS) have not clarified a single area of ambiguity. One public university (UPNM) does not have an existing policy dealing with ownership of research data. Therefore, the overall finding is that the legal impediment arising from ambiguity about ownership of research data in Malaysian public universities has not been fully resolved by the existing policies of Malaysian public universities.

The legal impediment arising from lack of a legal duty to ensure data quality has not been fully resolved as only three existing policies (i.e. UNIMAS, UNIMAP and UTEM) have developed a standard of care to ensure data quality. Furthermore, the standard of care developed by the existing policies of UNIMAS, UTEM and UMP is only imposed on university researchers. The standard of care is not imposed on other open access data providers such as the universities and repository centres. UTEM and UMP standard of care for ensuring data quality is further limited to published research results only. Therefore, the overall finding is that the legal impediment arising from lack of a legal to ensure data quality has not been fully resolved by the existing policies of Malaysian public universities.

Furthermore, the legal impediments which have been resolved by the existing policies of Malaysian public universities (i.e. ambiguity about ownership of research data and lack of a legal duty to ensure data quality) are still found to exist in other public universities which do not have a similar policy. So far, there is no common policy dealing with all the legal impediments and which is applicable to all Malaysian public universities.

Since nine out of 11 legal impediments have not been resolved by the existing policies of Malaysian public universities, the next step is to analyse the policies from other countries which support open access to and re-use of publicly funded research data. The analysis will assist this thesis to discover how these policies resolve the legal impediments to open access and re-use, which also exist under the Malaysian laws. Hence, the research question which will be answered in the next chapter is: How did the policies which support open access to and re-use of publicly funded research data from other countries resolve the legal impediments?

CHAPTER 7
COMPARATIVE ANALYSIS OF POLICIES FROM SELECTED COUNTRIES

7.1 OVERVIEW

The policy analysis undertaken in Chapter 6 found that nine out of 11 legal impediments that exist under the Malaysian laws have not been resolved by any of the existing policies of Malaysian public universities.[1086] Since the legal impediments have not been resolved, this chapter conducts a comparative analysis of policies from other countries. This comparative analysis serves to answer the fifth research question: How did the policies which support open access to and re-use of publicly funded research data from other countries resolve the legal impediments?

For the purpose of comparative analysis, the policies of public research funding agencies and universities from selected countries which support open access to and re-use of publicly funded research data are selected as samples of analysis. The selection of both public research funding agencies and universities as samples of analysis is consistent with the suggestion made by VM Moskovkin, which requires policies at both the national level and institutional level to be compared.[1087] In selecting the countries and the policies to be compared, Guttridge suggests that like must be compared with like, in term of concepts, rules or institutions under comparison.[1088] The likeness requirement also requires certain essential criteria to be observed in undertaking the comparative process: the topic under examination, the unity of the problem, and the evolutionary stage of different legal systems under comparison.[1089]

Based on the above suggestions, Australia, the UK and the US have been selected as the countries whose policies of public research funding agencies and universities are analysed and compared. The selection of Australia, the UK and the US is partly

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1086 See 6.3 – Summary. Two of the legal impediments which have been resolved by one or more existing policies of Malaysian public universities are ambiguity about ownership of research data and lack of a legal duty to ensure data quality. See table 6.2.2(a)-(e) and table 6.2.11.

1087 Moskovkin, above n 126, 269.

1088 HC Gutteridge, Comparative Law: An Introduction to the Comparative Method of Legal Study and Research (2nd ed, Cambridge University Press, London, 1949) 35.

1089 M Schmitthoff, 'The Science of Comparative Law' (1939) 7 *Cambridge Law Journal* 94.

because the legal impediments identified in Chapter 4 were mostly derived from the literature of these countries. Besides that, Australia, the UK and the US also share the common law system with Malaysia, which makes it easier to compare, adapt or adopt the laws and policies from these countries.

Besides the shared legal system, Australia, the UK and the US are the three countries with the highest number of research funding agencies and institutional mandates for open access archiving, with the public research funding agencies and universities from those countries making up the majority.[1090] In terms of proportion of open access repositories by country, a statistic published by Directory of Open Access Repositories reveals that the US and the UK have the greatest number of repositories with 371 and 176 repositories respectively, that make up 40% of open access repositories worldwide. Australia on the other hand, has the fifth highest number of open access repositories (63 repositories) behind the US, the UK, Germany and Japan. However, among the common law countries, Australia ranks third after the US and the UK. [1091]

In terms of public research funding agencies with data archiving policy, the UK and the US are among the top five countries in the world. Among the five countries, the UK has the highest number of public research funding agencies with data archiving policies.[1092] As for public research funding agencies with open access archiving policy, the UK and the US are among the countries with the highest number of public research funding agencies that have imposed open access self-archiving as part of the conditions for their research grant awards.[1093]

While the UK's position as the leader of open access is indisputable, the US is known as the first country with a proposed law that supports public access to publicly funded research results, known as the *Federal Research Public Access Act*

1090 'Summary By Type' Registry of Open Access Repository Material Archiving Policies, above n 103.

1091 See Directory of Open Access Repositories, 'Content Types in OpenDOAR Repositories - Worldwide' (2010) *University of Nottingham UK*, above n 92; 'Directory of Open Access Repositories', <http://www.opendoar.org/countrylist.php?> (at 21 June 2010).

1092 Other countries are Canada, Hungary and Ireland. See 'Sherpa Juliet: Research Funders' Open Access Policies', above n 102.

1093 Other countries are Spain (2), Belgium (1), Austria (1), Germany (1), Ireland (3), Switzerland (1), Sweden (1). See 'Sherpa Juliet: Research Funders' Open Access Policies', above n 102.

2006.[1094] Besides that, the US National Institute of Health is also the first public research funder in the world that makes it mandatory to deposit research data in its digital repository. As for Australia, Alma Swan's study has found that Australian open access initiatives are an exemplar when compared to India, the Netherlands, Germany, Canada, Scotland and France. All Australian's research universities have their own institutional archives, and the Department for Education, Science and Training (DEST) supports four open access projects covering 15 Australian universities.[1095]

Based on the above facts, a comparative analysis of policies of public research funding agencies and universities from Australia, the UK and the US can provide valuable inputs in resolving the legal impediments. The comparative analysis can also provide valuable inputs in developing a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

7.2 POLICIES FROM SELECTED COUNTRIES

7.2.1 Australia

A. Policies of the Public Research Funding Agencies in Australia

1. Australian Research Council Discovery Projects Funding Rules for Funding Commencing in 2011

The Australian Research Council (ARC) is the Australian Government's main agency for allocating research funding to academics and researchers in Australian universities. ARC funds research and researchers under the National Competitive Grants Program (NCGP), a significant component of Australia's investment in research and development. Administration of the NCGP is scheme-based and across inter-disciplinary groupings comprising of Biological Sciences and Biotechnology,

[1094] Peter Suber, 'Another OA Mandate: The Federal Research Public Access Act of 2006', <http://www.earlham.edu/~peters/fos/newsletter/05-02-06.htm#frpaa> (at 2 March 2010).

[1095] Swan et al, above n 124, 30.

Engineering, Mathematics and Informatics, Humanities and Creative Arts, Physics, Chemistry and Earth Sciences and Social, Behavioural and Economic Sciences.[1096]

The ARC Discovery Projects Funding Rules for Funding Commencing in 2011 (ARC Funding Rules) provide that the Commonwealth (i.e. the Australian Government) makes a major investment in research to support its essential role in improving the wellbeing of Australian society. To maximise the benefits from research, findings need to be disseminated as broadly as possible to allow access by other researchers and the wider community.[1097] The ARC therefore encourages researchers to consider the benefits of depositing their data and any publications arising from a research project in an appropriate subject and/or institutional repository. ARC requires a researcher who does not intend to deposit the data from a project in a repository within six months of the completion of the research, to include the reasons for not depositing the data in the project's final report. [1098]

2. National Health and Medical Research Council Dissemination of Research Findings Policy

The National Health and Medical Research Council (NHMRC) is Australia's main body for funding health and medical research.[1099] The NHMRC Project Grants Funding Policy for Funding Commencing in 2012 (NHMRC Grants Policy) provides that NHMRC strongly supports researchers depositing their data and any publications arising from a research project in an appropriate subject and/or institutional repository wherever such a repository is available to the researcher(s). The NHMRC Grants Policy also requires grant recipients to ensure that they comply with NHMRC policy on the dissemination of research findings.[1100]

1096 'ARC Profile' *Australian Research Council*, <http://www.arc.gov.au/about_arc/arc_profile.htm> (at 21 October 2011); Wikipedia, 'Australian Research Council', <http://en.wikipedia.org/wiki/Australian_Research_Council> (at 21 October 2011).

1097 ARC Discovery Projects Funding Rules for Funding Commencing in 2011, Dissemination of Research Outputs, [A1.3.1].

1098 Ibid [A1.3.3].

1099 'About' (2011) *National Health and Medical Research Council*, <http://www.nhmrc.gov.au/> (at 21 October 2011).

1100 NHMRC Project Grants Funding Policy for Funding Commencing in 2012, Dissemination of Scientific Findings, [17.2].

The NHMRC Dissemination of Research Findings Policy (NHMRC Dissemination Policy) was introduced pursuant to NHMRC Grants Policy. NHMRC Dissemination Policy provides that the Australian Government makes a major investment in research to support its essential role in improving the wellbeing of the Australian society. To maximise the benefits from research, findings need to be disseminated as broadly as possible to allow access by other researchers and the wider community. NHMRC therefore encourages researchers to consider the benefits of depositing their data and any publications arising from a research project in an appropriate subject and/or institutional repository wherever such a repository is available to the researcher(s). If the researcher is not intending to deposit the data from a project in a repository within a six month period, the researcher should include the reasons in the project's final report.[1101]

B. Policies of Australian Universities

There are 39 universities in Australia, 36 of which are public universities.[1102] A national body known as the Australian National Data Service (ANDS) was established in 2008, to enable, facilitate and support access to and re-use of research data of Australian universities as part of 'Australian Data Commons'.[1103] ANDS has listed five universities that have their own data policies. The data policies of the Australian universities listed by ANDS are:

i. Queensland University of Technology Data Management Guide;
ii. Griffith University Guidelines for Research Data Management.
iii. University of Melbourne Policy on the Management of Research Data and Records.
iv. University of New South Wales Procedure for Handling Research Material & Data
v. University of Newcastle Research Data and Materials Management Policy.[1104]

1101 NHMRC Dissemination of Research Findings Policy.
1102 Anonymous, 'University Profiles' (Universities Australia, 2011).
1103 'About ANDS' (2011) *Australian National Data Service*, <http://www.ands.org.au/about-ands.html> (at 24 October 2011).
1104 'General Information About Data Management' (2011) *Australian National Data Service* <http://www.ands.org.au/resource/data-management-planning.html> (at 24 October 2011).

Monash University is also found to have a policy which support open access to and re-use of publicly funded research data, though it is not listed by the ANDS. This chapter analyses the data policies of the Queensland University of Technology, Griffith University, the University of Newcastle and Monash University. The data policies of two other universities listed by the ANDS i.e. the University of New South Wales and the University of Melbourne, do not contain specific provision that supports open access to and re-use of publicly funded research data and therefore are not analysed.

1. Queensland University of Technology Management of Research Data Policy 2010

The Queensland University of Technology Management of Research Data Policy (QUT Policy) was approved by the University Academic Board on 26 March 2010. QUT Policy provides that the University recognises research data as a valuable product of research activity which can assist in promoting open enquiry and debate, complementing research outputs and publication, providing research transparency and justifying research outcomes.[1105] QUT Policy applies to research data created by all QUT researchers, including academic staff, professional staff and postgraduate students engaged in research activities associated or affiliated with QUT. [1106]

QUT Policy defines "research data" as facts, observations, images, computer program results, recordings, measurements or experiences on which an argument, theory, test, hypothesis or another research output is based. Data may be numerical, descriptive, visual or tactile. It may be raw, cleaned or processed and may be held in any format or media.[1107] Further according to QUT Policy, research data can be made accessible via a data repository (sometimes referred to as a data archive or data centre). Data repositories may be institutional, where the data owners are affiliated with the institution, or discipline based, where the data has relevance to a specific discipline.[1108]

1105 QUT Management of Research Data Policy 2010, Clause 2.8.1 - Policy Principles.
1106 Ibid [2.8.2] Application.
1107 Ibid [2.8.3] Definitions: research data.
1108 Guidelines for the Management of Research Data at QUT, Repositories and Data Centres, [8.1].

The Guidelines for the Management of Research Data at QUT (QUT Guidelines) were introduced in 2010 to implement QUT Policy.[1109] QUT Guidelines state that QUT is committed to the principle of open access to the results of publicly funded scholarship and encourages its staff and students to generate and share knowledge that will provide social, cultural and economic benefits for QUT and the wider community. According to QUT Guidelines, the default position should be to consider data sharing unless there are compelling reasons why this is not appropriate. Even where the data cannot be made openly accessible, it may be that a subset of the data can be made accessible on request.[1110]

In terms of the legal impediments, QUT Policy provides that researchers should comply with copyright, moral rights and license requirements when using or re-using research data made available by other researchers.[1111] Apart from QUT Policy, QUT Guidelines also acknowledge that a considerable proportion of research data is covered by copyright in Australia.[1112] QUT Guidelines provide that, if the dataset is openly accessible online via the repository, the end-user needs the copyright owner's permission to use the dataset. This license is usually attached to the dataset in the repository so end-users can determine limits to use granted by the copyright owner.[1113]

Further, according to QUT Policy, access to research data should also be considered in the context of ethical, privacy, confidentiality, cultural and intellectual property requirements. In terms of confidentiality, a dataset or database may include information that is secret or confidential. Confidential research data must be managed in accordance with any contractual or funding agreements.[1114] In QUT Guidelines, it is stated that actual or threatened disclosure of confidential information may result in legal liabilities.[1115] According to QUT Guidelines, an action for breach of confidence can be brought against any person who discloses the confidential data

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1109 QUT Guidelines were prepared by Paula Callan, Janet Baker and Lance De Vine and was last modified on 25th October, 2010.

1110 Guidelines for the Management of Research Data at QUT, Access and Re-Use, [8].

1111 Ibid [2.8.5(g)].

1112 Ibid [2.1] Copyright and Research Data.

1113 Ibid [8.3.1] Copyright Licensing.

1114 QUT Management of Research Data Policy 2010, Privacy and Confidentiality, [2.8.5(f)].

1115 Guidelines for the Management of Research Data at QUT, Confidentiality, [6.2].

against the written agreement or to the detriment of those who wish to keep it confidential. [1116]

In terms of privacy, QUT Guidelines acknowledge that research data, particularly in health-related disciplines, may contain personal information about identified individuals. As a statutory authority, QUT must comply with the requirements of the Information Privacy Act 2009 which is designed to provide safeguards for the handling of an individual's personal information in the public sector environment.[1117]

To ensure data quality, QUT Guidelines provide guidelines on documentation and metadata. [1118] It is stated in QUT Guidelines that good documentation adds value to research data as it ensures that the data will be easier to understand and the quality of the data will be easier to judge. According to QUT Guidelines, documentation requirements will vary depending on the discipline and type of research being conducted.[1119]

2. Griffith University Guidelines for Research Data Management (V.4)

The Griffith University Guidelines for Research Data Management (GU Guidelines) were last revised on 21 May 2009. GU Guidelines define "data" as information stored in digital form, including text, numbers, images, audio, video, software, algorithms, equations, animations, model, simulations, digital surrogates of physical objects (eg sculpture, jewellery, 3D scans/models, motion capture data, and historical documents) etc.[1120] The GU Guidelines classify data into observational data, experimental data, analysed data, creative and performing arts data.[1121]

GU Guidelines state that research data is valuable for a number of reasons. In the first instance, it has value to researchers for the duration of their research. It may also have residual value to those researchers after results have been published, as well as value for other researchers or the wider community. Further according to GU Guidelines, given the investment the university has made in the research, data needs

1116 Ibid [6.2] Confidentiality.
1117 Ibid [6.1] Privacy.
1118 Ibid [5] Documentation and Metadata.
1119 Ibid [5.1] Documentation.
1120 GU Guidelines for Research Data Management (V.4) 2009, Definitions – data, [2.4].
1121 Ibid [2.4.1] – [2.4.4].

to be carefully managed to be accessible for use and re-use, in ways that satisfy legal, statutory and funding bodies' requirements. GU Guidelines also state that, while most data is initially private to an individual researcher or group, it is possible that either now or later such data may be useful to other researchers or the wider community.[1122]

In terms of the legal impediments, GU Guidelines state that free and open access to data is subject to access regimes, confidentiality agreements and copyright and intellectual property issues.[1123] According to GU Guidelines, any access to research data would be governed in the first instance by the researcher or research group, and be subject to privacy and intellectual property considerations as outlined in the Griffith University Privacy Plan, Griffith University Intellectual Property Policy, Griffith University IT Code of Practice and Griffith University Code for the Responsible Conduct of Research.[1124] Further, according to GU Guidelines, the originators/creators of research data at Griffith University have certain rights to use and disseminate the data which will be in accordance with the Griffith University Intellectual Property Policy.[1125]

3. University of Newcastle Australia Research Data and Materials Management Policy 2008

The University of Newcastle Australia Research Data and Materials Management Policy (UNA Policy) was approved in 3 December 2008. In UNA Policy "research data" means data as facts, observations, computer results, measurements or experiences on which an argument, theory or test is based. Data may be numerical, descriptive or visual. Data may also be raw or analysed, experimental or observational.[1126]

In terms of the legal impediments, it is stated in UNA Policy that research data and primary materials should be made available for use by other researchers for further research unless precluded by the conditions under which they were obtained, privacy

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1122 Ibid [3.9] Security - access policies and provisions and confidentiality requirements.

1123 Ibid.

1124 Ibid.

1125 Ibid [2.10] Definitions - Originators. In the GU Guidelines, "Originators" are people who create data such as authors or inventors. See Griffith University Guidelines for Research Data Management (V.4) 2009, Originators and Owners of the Data, [3.1].

1126 UNA Research Data and Materials Management Policy 2008, Clause 3- Definitions, Research Data; Access to Research Data and Primary Materials, [7].

or confidentiality matters. [1127] The policy explains that preclusions on the basis of confidentiality include not only formal confidentiality agreements but also should be employed where research/development is focused on achieving a defined piece of protectable intellectual property.[1128]

4. Monash University Research Data and Management Policy 2010

The Monash University Research Data Management Policy (MU Policy) which took effect from 24 November 2010 was introduced to ensure that research data is stored, retained, made accessible for use and re-use, and/or disposed of, according to legal, statutory, ethical and funding bodies' requirements.[1129] The policy applies to all MU staff, adjuncts, visitors and students engaged in research in all disciplines, irrespective of their location. It also applies to all research data, regardless of format, and subject to the provisions of any relevant contracts or funding/collaboration agreements.[1130]

In its policy statement, MU Policy states that MU supports the guidelines and initiatives designed to improve access to publicly funded research data, in particular the OECD Principles and Guidelines for Access to Research Data from Public Funding 2007.[1131] The policy further states that MU recognises research data may have value for other researchers or the wider community. [1132] MU also recognises that access to research data can raise the research profile of individuals and institutions, increase returns on public investment, promote open inquiry and debate, and enable innovative uses of data that may not have been foreseen by the researchers at the time of its creation. [1133]

In terms of the legal impediments, MU Policy states that the management of research data should be compatible with the University's commitment to the highest ethical standards in research, protecting the rights, dignity, health, safety and privacy of the community, including research subjects and with its commitment to the welfare of

1127 UNA Research Data and Materials Management Policy 2008.
1128 Ibid [4] Ownership of Research Data and Primary Materials.
1129 MU Research Data Management Policy 2010 - Purpose.
1130 Ibid Scope.
1131 Ibid Policy Statement.
1132 Ibid Policy Statement.
1133 Ibid Policy Statement.

animals and the integrity of the environment. Further according to the policy, to optimise research outcomes, data must be made accessible for use and re-use according to legal, statutory, ethical and funding bodies' requirements. [1134]

7.2.2 The United Kingdom

A. Policies of the Public Research Funding Agencies in the UK

The public research funding agencies in the UK comprise of seven research councils i.e. Arts and Humanities Research Council (AHRC), Biotechnology and Biological Sciences Research Council (BBSRC), Engineering and Physical Sciences Research Council (EPSRC), Economic and Social Research Council (ESRC), Medical Research Council (MRC), Natural Environment Research Council (NERC) and Science and Technology Facilities Council (STFC). Another major public research funding agency in the UK is Cancer Research UK (CRUK). The seven research councils form Research Councils UK (RCUK) as a strategic partnership between all the Research Councils. Each year, Research Councils UK invest around £3 billion in research covering the full spectrum of academic disciplines from the medical and biological sciences to astronomy, physics, chemistry and engineering, social sciences, economics, environmental sciences and the arts and humanities.[1135]

1. Research Councils of the United Kingdom Common Principles on Data Policy

The Research Councils of the United Kingdom Common Principles on Data Policy (RCUK Policy) provide an overarching framework for individual research councils policies on data. RCUK has outlined 7 Common Principles on Data Policy which support open access to and re-use of publicly funded research data.[1136] The principles

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1134 Ibid Policy Statement.

1135 'Welcome to Research Council UK' *Research Councils UK*, <http://www.rcuk.ac.uk/Pages/Home.aspx> (at 21 October 2011).

1136 Those Common Principles are: i) Publicly funded research data are a public good, produced in the public interest, which should be made openly available with as few restrictions as possible in a timely and responsible manner that does not harm intellectual property; ii) Institutional and project specific data management policies and plans should be in accordance with relevant standards and community best practice. Data with acknowledged long-term value should be preserved and remain accessible and usable for future research; iii)To enable research data to be discoverable and effectively re-used by others, sufficient metadata should be recorded and made openly available to enable other researchers to understand the research and re-use potential of the data. Published results should always include information on how to access the supporting data; iv) RCUK recognises that there are legal, ethical and commercial constraints

outlined by RCUK Policy have been adopted by all public research councils in the UK. With the exception of AHRC, six other research councils that administer public funded research in their respective disciplines have their own policies which support open access to and re-use of publicly funded research data. Despite sharing the common principles, the extent and detail of the policies vary greatly between one research council and another. Analysis is therefore made of the policies of those research councils.

2. UK Engineering and Physical Sciences Research Council Policy on Research Data

The UK Engineering and Physical Sciences Research Council Policy on Research Data (EPSRC Policy) was endorsed by EPSRC Council in March 2011 and implemented from May 2011. It was developed with the benefit of advice from university administrators, academics and research collaborators based in industry.[1137] EPSRC Policy reflects the legal principal contained in the Freedom of Information Act 2000 and Freedom of Information (Scotland) Act 2002, and aims to assure public access to publicly held information, including access to EPSRC funded research data.[1138]

In EPSRC Policy, "research data" is defined as recorded factual material commonly retained by and accepted in the scientific community as necessary to validate research findings. The definition further states that although the majority of research data is created in digital format, all research data is included irrespective of the

on release of research data. To ensure that the research process is not damaged by inappropriate release of data, research organisation policies and practices should ensure that these are considered at all stages in the research process; v) To ensure that research teams get appropriate recognition for the effort involved in collecting and analysing data, those who undertake Research Council funded work may be entitled to a limited period of privileged use of the data they have collected to enable them to publish the results of their research. The length of this period varies by research discipline and, where appropriate, is discussed further in the published policies of individual Research Councils; vi) In order to recognise the intellectual contributions of researchers who generate, preserve and share key research datasets, all users of research data should acknowledge the sources of their data and abide by the terms and conditions under which they are accessed; vii)It is appropriate to use public funds to support the management and sharing of publicly-funded research data. To maximise the research benefit which can be gained from limited budgets, the mechanisms for these activities should be both efficient and cost-effective in the use of public funds. See RCUK Common Principles on Data Policy.

1137 EPSRC Policy on Research Data 2011.

1138 Ibid.

format in which it is created.[1139] EPSRC Policy's guiding principles on access to and re-use of research data is aligned with the RCUK Common Principles on Data Policy. The guiding principles are applicable to all research data created from EPSRC funding.[1140]

In terms of the legal impediments, EPSRC policy acknowledges that there are several exemptions, which may be absolute or qualified, generally relating to considerations such as national security, law enforcement, commercial interests or data protection. EPSRC Policy also recognises that there are legal, ethical and commercial constraints on release of research data to the public.[1141]

3. UK Medical Research Council Data Access Principles and Data Sharing and Preservation Policy

The Medical Research Council Principles for Access to and Use of MRC Funded Research Data (MRC Data Access Principles) were built on the RCUK Common Principles as well as on the central principles of Open Access to Publicly Funded Research Data outlined by the OECD.[1142] MRC Data Access Principles state that every year MRC invests around £500 million of public money in research, the primary output of which is data. MRC Data Access Principles recognise that there is a need to make a better use of the research opportunities that such a diversity, richness and quantity of publicly funded research data provide. [1143]

MRC Data Access Principles promote new and extended use of all MRC funded data for high quality, ethical research. According to MRC Data Access Principles, responsible sharing allows testing of new hypotheses and analyses, linkage and pooling of datasets and validation of research findings. The principles also state that data sharing activities not only reduce duplication of data creation but also enhance the long-term scientific value of existing data. [1144]

1139 Ibid Scope.
1140 Ibid Principles.
1141 Ibid.
1142 Principles for Access to and Use of MRC Funded Research Data - Data Access Principles.
1143 Ibid.
1144 Ibid.

In terms of the legal impediments, MRC Policy on Data Sharing and Preservation (MRC Policy) lists protection of national security, confidentiality and privacy, intellectual property rights and time-limited exclusive use by data creators as among the restrictions that exist.[1145] In dealing with these restrictions, MRC Policy requires the researchers to make clear provision for doing so when planning and executing their research.[1146] MRC Policy further states that, for medical research involving personal data, the appropriate regulatory permissions, whether ethical, legal or institutional must be in place before the data can be shared.[1147]

4. Biotechnology and Biological Sciences Research Council Data Sharing Policy Version 1.1 June 2010

The Biotechnology and Biological Sciences Research Council Data Sharing Policy (BBSRC Policy) in its policy background states that BBSRC sponsors a wide range of scientific research that generates large volumes of data. This includes data which contains information about protein structure, DNA sequencing and proteomics as well as data arising from imaging, agricultural, environmental research and species information.[1148] BBSRC policy background further states that such data is important not only for the researchers originating the work, but also to the wider scientific community, who may wish to examine and use these datasets to underpin other investigations. The policy background also states that re-use of data can lead to new scientific understanding and examples of this already exist.[1149]

BBSRC Policy Statement states that BBSRC recognises the importance of contributing to the growing international efforts in data sharing. BBSRC believes that making research data more readily available will reinforce open scientific enquiry and stimulate new investigations and analyses. BBSRC also supports the view that data sharing should be led by the scientific community and driven by scientific needs. It should also be cost effective and the data shared should be of the highest quality. [1150]

1145 MRC Policy on Data Sharing and Preservation - Key Principles of our Policy.
1146 Ibid.
1147 Ibid Policy Statement.
1148 BBSRC Data Sharing Policy 2010, Background and Context – Scientific.
1149 Ibid.
1150 Ibid BBSRC's Position - BBSRC Data Sharing Policy Statement.

While expecting research data to be shared, BBSRC Policy recognises that different fields of study will require different data sharing approaches. Therefore, BBSRC Policy aims to achieve the sharing of data in an appropriate manner and not to be overly prescriptive.[1151] However, BBSRC Policy reserves the right to implement a more prescriptive approach to data sharing for research initiatives (particularly those involving large scale collaborative approaches) or where BBSRC is supporting a community resource. [1152]

In BBSRC Data Sharing Policy Implementation, it is stated that all applicants seeking research grant funding from BBSRC must submit a statement on data sharing in data management plan and must provide explicit reasons why data sharing is not possible or appropriate.[1153] It is also stated that different approaches to data sharing will be required in different situations and considers that it is most appropriate for researchers to determine their own strategies for data sharing and outline these strategies within their research grant proposal(s).[1154]

BBSRC Policy is implemented through mechanisms that facilitate and encourage data sharing in the bioscience community.[1155] In making available the research data, BBSRC Policy expects that data sharing strategies will fall into two broad categories of methods of data sharing. First, data sharing by way of deposition in an existing database, repository or other community resources is expected where possible and researchers are encouraged to share data through mechanisms affording the widest availability for generating added value and enabling re-use. Second, where no existing infrastructure funded by BBSRC to facilitate data sharing exists, data may be shared through third party mechanisms such as journal websites and/or open access repositories.[1156] Where suitable third party mechanisms are not available, researchers are expected to maintain the research data for a period of 10 years after

1151 BBSRC Data Sharing Policy 2010.
1152 Ibid Data Sharing Areas.
1153 Ibid Research Grant Proposals, Policy Implementation 1 - Integrating Data Sharing into Existing Support and Monitoring Processes.
1154 Ibid Research Grant Proposals, Policy Implementation 1 - Integrating Data Sharing into Existing Support and Monitoring Processes, Data Sharing *via* a 3rd Party.
1155 Ibid BBSRC's Position.
1156 Ibid Research Grant Proposals, Policy Implementation 1 - Integrating Data Sharing into Existing Support and Monitoring Processes, Data Sharing *via* a 3rd Party.

the completion of the research project where such data can be made available on request. [1157]

5. Natural Environment Research Council Data Policy 2011

The Natural Environment Research Council Data Policy (NERC Data Policy) was approved by the NERC Executive Board in September 2010 and came into force in January 2011.[1158] The NERC Data Policy Statement states that NERC has a policy on data in order to:

i. Ensure the continuing availability of environmental data of long-term value for research, teaching, and for wider exploitation for the public good, by individuals, governments, business and other organizations;
ii. Support the integrity, transparency and openness of the research it supports;
iii. Help in the formal publication of data sets, as well as enabling the tracking of their usage to be tracked through citation and data licenses; and
iv. Meet relevant legislation and government guidance on the management and distribution of environmental information.[1159]

NERC Data Policy covers environmental data acquired, assembled or created through research, survey and monitoring activities that are either fully or partially funded by NERC.[1160] NERC defines environmental data as individual items or records (both digital and analogue) usually obtained by measurement, observation or modelling of the natural world and the impact of humans upon it. This includes data generated through complex systems, such as information retrieval algorithms, data assimilation techniques and the application of models.[1161] NERC also considers that long term, open access to the data that underpins research publications will help to ensure the integrity, transparency and robustness of the research record. Access to this data supports the fundamental scientific requirement of allowing others to confirm or challenge research results.[1162]

1157 Ibid Research Grant Proposals, Policy Implementation 1 - Integrating Data Sharing into Existing Support and Monitoring Processes, Direct Data Sharing: from Originator to Others.
1158 NERC Data Policy 2011.
1159 Ibid NERC Data Policy Statement.
1160 Ibid.
1161 Ibid.
1162 Ibid Open Access to Data Underpinning Research Publications.

NERC has developed the NERC Data Policy - Guidance Notes (NERC Guidance Notes) which provides guidance in implementing NERC Data Policy. According to NERC Guidance Notes, "NERC funded" is where NERC has been a full or a partial funder of the activities that create environmental data.[1163] Data Creators on the other hand has been defined as individuals, teams or organisations that collect or generate data as part of NERC funded activities, including scientists in Higher Education Institutes and NERC's Research Centres. [1164]

In terms of the legal impediments, NERC Guidance Notes acknowledged that, NERC and the majority of organisations that it funds are subject to the various legislations, which provide a set of rules which NERC and other public bodies, such as universities, must follow in deciding if data or information can be made publicly available.[1165]

6. Economic and Social Research Council Data Policy 2010

In the Economic and Social Research Council Data Policy (ESRC Policy), "research data" is understood broadly as both primary input into research and first order results of that research.[1166] In cases where applications for funding involve the creation of new data, ESRC Policy requires among others that:

i. the applicants submit a statement on data sharing in the relevant section of the application form or provide explicit reasons why data sharing is not possible or appropriate;
ii. the applicants provide a data management and sharing plan as part of their application;
iii. the data must be made available for preparation for re-use and/or archiving with the ESRC data service providers within three months of the end of the award;
iv. the right to grant waivers is reserved only where sufficient evidence has been given demonstrating that data cannot be archived. [1167]

1163 Ibid [2] Guidance Notes, Definition of Terms : NERC-funded.
1164 Ibid [2] Guidance Note, Definition of Terms : Data Creators.
1165 Ibid [4(g)] Guidance Notes: Access by Others to Data Generated by NERC Funding.
1166 ESRC Research Data Policy 2010, Introduction, [1].
1167 Ibid [1.2(10)] ESRC's Policy Statement.

The Implementation Guidance of ESRC Policy states that data sharing and re-use is becoming increasingly important within and across disciplines.[1168] ESRC Implementation Guidance also states that ESRC considers effective data management an essential pre-condition to data sharing. The ESRC Implementation Guidance requires those ESRC grant applicants who plan to generate data to prepare and submit data management and sharing plans for their research projects as an integral part of the application.[1169]

In terms of the legal impediments, ESRC Policy expects award holders to meet the copyright requirements set down in the *Copyright, Designs and Patents Act 1998*. Responsibility for ensuring compliance with all laws and other legal instruments rests with the award holders and/or their institutions.[1170] ESRC Policy also expects award holders to adhere to the Data Protection Act 1998 which contains eight principles of good practice, applying to anyone processing personal data, including the use of personal data in research. [1171] In this regard, ESRC Policy recognises that some research data is more sensitive than others and argues that it is a responsibility of the award holders to consider all issues related to confidentiality, security and copyright before initiating the research.[1172] Further according to ESRC Policy, the data service providers will provide guidance to ESC award holders on issues related to confidentiality, security and ethics in data sharing.[1173]

7. Cancer Research UK Policy on Data Sharing and Preservation 2009

The Cancer Research UK Policy on Data Sharing and Preservation (CRUK Policy) regards as good research practice for all researchers to consider at the research proposal stage how they will manage and share the data they will generate. CRUK Policy further provides that, any applicant who considers that the data arising from their proposals will not be suitable for sharing must provide clear reasons for not making it available.[1174]

1168 Ibid [2] Implementation Guidance.
1169 Ibid [2.3.1(18)] Responsibilities of ESRC Grant Applicants.
1170 Ibid [2.5.2(37)] Copyright and Confidentiality.
1171 Ibid [2.5.4(40)] Data Protection and Freedom of Information.
1172 Ibid [2.4(31)] Sharing Sensitive Data: Joint Responsibilities.
1173 Ibid [2.3.4(29)] Responsibilities of ESRC Data Service Providers.
1174 CRUK Policy on Data Sharing and Preservation 2009 - Submission of a Data Sharing and Preservation Strategy.

CRUK Data Sharing Guidelines (CRUK Guidelines) have been introduced to implement CRUK Policy. The Guidelines state that CRUK Policy is applicable to all candidates seeking funding from Cancer Research UK after 1st April 2009 and applies among others to the sharing of final research data for research purposes.[1175] CRUK Guidelines also state that given the diverse nature of the research CRUK supports, the guidelines do not prescribe precisely how and when investigators should share research data. Instead they should be used to ensure that the principles of the policy are adhered to.[1176]

In terms of the legal impediments, CRUK Policy states that, researchers who are providing and receiving data are required to adhere to any relevant regulatory requirements including those relating to the ethical use of data.[1177] For medical research involving personal data, the appropriate regulatory permissions – ethical, legal and institutional – must be in place before the data can be shared.[1178] To ensure that data is used appropriately, investigators may consider implementing a data sharing agreement that indicates the criteria for data access and conditions for research use. This can ensure the responsibilities of both parties, along with intellectual property, citation and publication rights are agreed at the outset. A data sharing agreement may incorporate privacy and confidentiality standards, as needed, to ensure data security at the recipient site and prohibit manipulation of data.[1179]

B. Policies of the UK Universities

Despite the fact that there are 131 public universities in the UK, only nine universities in the UK release their internal data. These nine universities have created an online directory of UK Higher Education Open Data, hosted by the University of Southampton. Out of these nine universities, only one university (University of Edinburgh) has a policy which supports open access to and re-use of publicly funded research data.[1180] It is also found that three universities in the UK have been listed

1175 CRUK Data Sharing Guidelines 2009 – Applicability.
1176 Ibid Cancer Research UK's Stance on Data Sharing.
1177 CRUK Policy on Data Sharing and Preservation 2009, [2].
1178 Ibid [6].
1179 CRUK Data Sharing Guidelines 2009 - Data Sharing Agreements.
1180 'Open Data from UK Academic Institutions' *The University of Southampton*, <http://data-ac-uk.ecs.soton.ac.uk/> (at 20 October 2011).

by the UK Digital Curation Centre as having institutional data policies. Those universities are the University of Oxford, University of Edinburgh and University of Hertfordshire. Among the three universities, it is again found that the University of Edinburgh is the only university which has a policy which supports open access to and re-use of publicly funded research data.[1181] Therefore, policy analysis of the UK universities is made with reference to the policy of the University of Edinburgh.

1. University of Edinburgh's Policy for Management of Research Data 2011

The University of Edinburgh's Policy for Management of Research Data (UE Policy) was approved by the University Court on 16 May, 2011. The University acknowledges that the policy approved by them is an aspiration policy and that implementation will take some years.

In terms of the legal impediments, UE Policy states that in many cases factors including the collaborative and international basis of many research projects make the nature and extent of intellectual property rights in research data unclear.[1182] It is also acknowledged by UE Policy that open data approaches cannot be used in all cases, for a variety of reasons, including ethics, privacy and exploitation of intellectual property, and reduced or restricted access to data is acceptable where these apply. [1183]

7.2.3 The United States of America

A. Policies of the Public Research Funding Agencies in the US

Two major public research funding agencies in the US, the National Institute of Health (NIH) and the National Science Foundation (NSF) have their own policies which support open access to and re-use of publicly funded research data. The NIH is the largest source of funding for medical research in the world, funding thousands of scientists in universities and research institutions in the US and around the world.

1181 'UK Institutional Data Policies' (2010) *Digital Curation Centre*, <http://www.dcc.ac.uk/resources/policy-and-legal/institutional-data-policies> (at 20 October 2011).

1182 UE Policy for Management of Research Data 2011, [7].

1183 Ibid.

NIH is made up of 27 institutes and centres**,** each with a specific research agenda. More than 80% of the NIH's budget goes to more than 300,000 research personnel at over 3,000 universities and research institutions. In addition, about 6,000 scientists work in NIH's own Intramural Research laboratories.[1184]

The NSF on the other hand is an independent US federal agency created by Congress in 1950. The NSF mission is to promote the progress of science, to advance national health, prosperity and welfare and to secure national defence. In 2010, with an annual budget of about USD6.9 billion, NSF funded approximately 20 percent of all federally supported basic research conducted by America's colleges and universities. In many fields such as mathematics, computer science and the social sciences, NSF is the major source of federal backing.[1185]

Besides the NIH and NSF, the Centers for Disease Control and Prevention (CDC) also has a policy which supports open access to and re-use of publicly funded research data. CDC, together with the Agency for Toxic Substances and Disease Registry (ATSDR), are the principal disease prevention and health promotion agencies in the US. To help accomplish its mission to promote health and quality of life by preventing and controlling disease, injury, and disability, CDC awards nearly 85 percent of its budget through grants and contracts. It is estimated that, each year, CDC awards approximately USD7 billion in over 14,000 separate grant and contract.[1186]

Due to the significance of the NIH, NSF and CDC/ATDSR as public research funding agencies in the US, analysis is therefore made of their policies which support open access to and re-use of publicly funded research data.

1184 'About NIH' (2011) *National Institutes of Health*, <http://www.nih.gov/about/> (at 24 October 2011).

1185 'NSF at a Glance' (2010) *National Science Foundation*, <http://www.nsf.gov/about/glance.jsp> (at 24 October 2011).

1186 'CDC′s Procurement and Grants Office' (2005) *Centers for Disease Control and Prevention*, <http://www.cdc.gov/about/business/funding.htm> (at 25 October 2011).

1. National Institutes of Health Data Sharing Policy and Implementation Guidance 2003

The NIH Data Sharing Policy and Implementation Guidance 2003 (NIH Policy) applies to applications submitted beginning October 1, 2003 and applies to applicants seeking USD500,000 or more in direct costs in any year of the proposed project period through grants, cooperative agreements or contracts. NIH Policy states that all data including final research data should be considered for data sharing.[1187] The term "final research data" has been defined by the NIH Policy as recorded factual material commonly accepted in the scientific community as necessary to document, support, and validate research findings. It is stated in the definition that for most studies, final research data will be a computerised dataset upon which the accepted publication was based. For some but not all scientific areas, the final dataset might include both raw data and derived variables, which would be described in the documentation associated with the dataset. [1188]

In terms of the legal impediments, NIH Policy states that, data should be made as widely and freely available as possible while safeguarding the privacy of participants and protecting confidential and proprietary data.[1189] In implementing the policy, NIH requires the rights and privacy of human subjects who participate in NIH-sponsored research to be protected at all times. The investigators, the Institutional Review Board (IRB) and the research institution are responsible for protecting the rights of subjects and the confidentiality of the data.[1190] The method for data sharing is likely to depend on several factors, including the sensitivity of the data, the size and complexity of the dataset and the volume of requests anticipated.[1191]

2. National Science Foundation (NSF) Data Sharing Policy 2011

The National Science Foundation Data Sharing Policy 2011 (NSF Policy) expects investigators to share with other researchers, at no more than incremental cost and

1187 NIH Data Sharing Policy and Implementation Guidance 2003 – Applicability.
1188 Ibid Implementation.
1189 Ibid Goals of Data Sharing.
1190 Ibid Human Subjects and Privacy Issues.
1191 Ibid Methods for Data Sharing.

within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants.[1192]

In terms of the legal impediments, the NSF Award and Administration Guide effective 18 January, 2011 provides that privileged or confidential information should be released only in a form that protects the privacy of individuals and subjects involved. General adjustments and, where essential, exceptions to this sharing expectation may be specified by the funding NSF Program or Division/Office for a particular field or discipline to safeguard the rights of individuals and subjects, the validity of results or the integrity of collections or to accommodate the legitimate interest of investigators. A grantee or investigator also may request a particular adjustment or exception from the cognizant NSF Program Officer. [1193]

3. Division of Earth Sciences (National Science Foundation) Policy Statement on Dissemination and Sharing of Research Results 2010

The Division of Earth Sciences (EAR) of NSF issued a Policy Statement (EAR Policy) in September 2010. EAR Policy provides guidelines to ensure and facilitate full and open access to quality data for research and education in the Earth Sciences. EAR Policy states that EAR conforms to NSF policy statements on sharing of research results and data as contained in the NSF Award and Administration Guide, January 2010.

EAR Policy expects its grant recipients to encourage and facilitate such sharing. The policy also expects the investigators to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data, samples, physical collections and other supporting materials created or gathered in the course of work under the research grants.[1194]

In terms of the legal impediments, EAR Policy states that privileged or confidential information should be released only in a form that protects the privacy of individuals and subjects involved. General adjustments and, where essential, exceptions to this

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1192 'Dissemination and Sharing of Research Results' (2011) *National Science Foundation*, <http://www.nsf.gov/bfa/dias/policy/dmp.jsp> (at 24 October 2011).

1193 NSF Award and Administration Guide 2011, Dissemination and Sharing of Research Results, Chapter VI: Other Post Award Requirements and Considerations, [D.4].

1194 EAR Policy Statement on Dissemination and Sharing of Research Results 2010, Dissemination and Sharing of Research Results, [b].

sharing expectation may be specified by the funding NSF Program or Division/Office for a particular field or discipline to safeguard the rights of individuals and subjects, the validity of results or the integrity of collections or to accommodate the legitimate interest of investigators. A grantee or investigator also may request a particular adjustment or exception from the cognizant NSF Program Officer.[1195] To ensure data quality, EAR is committed to the establishment, maintenance, validation, description and distribution of high-quality and long-term data sets. [1196]

4. Centers for Disease Control and Prevention and Agency For Toxic Substances And Disease Registry Policy On Releasing And Sharing Data 2005

The Centers for Disease Control and Prevention and the Agency For Toxic Substances And Disease Registry Policy On Releasing And Sharing Data 2005 (CDC/ATDSR Policy) was first issued on 16 April 2003 and was later updated on 9 July 2005. CDC/ATDSR believe that public health and scientific advancement are best served when data is released to or shared with other public health agencies, academic researchers, and appropriate private researchers in an open, timely, and appropriate way. The interests of the public—which includes timely releases of data for further analysis—transcends whatever claim scientists may believe they have to ownership of data acquired or generated using federal funds. According to CDC/ATDSR Policy, such data is, in fact, owned by the federal government and thus belongs to the citizens of the United States.[1197]

CDC/ATDSR Policy defines "Data Release" as dissemination of data either for public use or through an ad hoc request that results in the data steward no longer controlling the data.[1198] The following data is covered by this policy:

i. Data collected by CDC using federal resources;
ii. Data collected for CDC by other agencies or organizations (through procurement mechanisms such as grants, contracts, or cooperative agreements); and
iii. Data reported to CDC (eg, by a state health department).[1199]

1195 Ibid.
1196 Ibid [2] Dissemination and Sharing of Research Results.
1197 CDC/ATDSR Policy on Releasing and Sharing Data 2005, Background, [1].
1198 Ibid Appendix B: Glossary.

In terms of the legal impediments, CDC/ATDSR Policy recognises that restrictions can be imposed because of legal constraints or because releasing the data would risk disclosing proprietary or confidential information or compromising national security or law enforcement interests.[1200] CDC/ATDSR Policy also recognises the need to maintain high standards for data quality, the need for procedures that ensure that the privacy of individuals who provide personal information is not jeopardised, and the need to protect information relevant to national security, criminal investigations or misconduct inquiries and investigations.[1201] In light of the above recognitions, the policy requires all data to be released and/or shared without compromising privacy concerns, federal and state confidentiality concerns, proprietary interests, national security interests or law enforcement activities.[1202]

B. Policies of the US Universities

In the US, 57 percent of federally funded research is conducted by universities that are members of the Association of American Universities (AAU). AAU is an association of 62 leading public and private research universities in the US and Canada. The AAU member universities are distinguished by strong programs of research and graduate education. AAU member universities are also major contributors to the international scholarly publishing system as well as primary consumers of the products of that system. AAU believes that increasing public access to federally funded research can increase the return on that investment in a number of ways including expanding access to the results of research for the taxpayers who funded that research, and providing a richer, more interconnected foundation of research results to support future scholarship.[1203]

1199 Ibid Data Covered By This Policy.
1200 Ibid Clause VII - How to Release Data.
1201 Ibid Background.
1202 Ibid Purpose.
1203 'AAU Members' (2010) *The Association of American Universities*, <http://www.aau.edu/about/default.aspx?id=4020> (at 25 October 2011).

From 62 AAU member universities, eight universities have their own data policies. Those universities are University of Washington,[1204] Cornell University,[1205] Stanford University, [1206] John Hopkins University,[1207] University of Arizona,[1208] University of Florida,[1209] New York University,[1210] Rice University,[1211] and Northwestern University.[1212] Among these universities, the policies of the University of Washington and Cornell University support open access to and re-use of publicly funded research data. Besides these two universities, three non-AAU member universities i.e. Virginia Commonwealth University, University of Newhampshire and University of Tennessee also have their own policies that support open access to and re-use of publicly funded research data. The policies of both AAU and non-AAU member universities are hereby analysed.

1. University of Washington Research Data Policy 2008

The University of Washington Research Data Policy (UW Policy) dated February 2008 states that it is the policy of the University of Washington to preserve, protect, and share research data in accordance with academic, scientific and legal norms.[1213] Under UW Policy, "research data" means information, records and tangible products arising from or associated with research conducted under the auspices of or using the resources of the University. Research data includes both intangibles (eg, information and copyrighted works such as software and expressions of information) and tangibles (eg, cell lines, biological samples collected for research purposes, synthetic compounds, organisms, and originals or copies of laboratory notebooks).[1214]

The UW Policy applies to all University faculty, staff, students and any other persons at the University involved in the design, conduct, or reporting of research at or under the auspices of the University, and it applies to all research projects on which those

1204 University of Washington Research Data Policy 2008.
1205 Cornell University Research Data: Recording, Retention and Access Policy 2007.
1206 Stanford University Retention of and Access to Research Data (RPH 2.10).
1207 John Hopkins University Policy on Access and Retention of Research Data and Materials 2008.
1208 University of Arizona Data Access Policy 2008.
1209 University of Florida Data Management and Access Plan
1210 New York University Policy on Retention of and Access to Research Data 2010.
1211 Rice University Data Management and Access Plan.
1212 Northwestern University Data Access Policy 2007.
1213 UW Research Data Policy 2008, Background: Purpose, Definitions and Context, [I.1].
1214 Ibid [I.2].

individuals work, regardless of the source of funding for the project.[1215] The policy states that where research is funded by a grant or contract with the University that includes specific provisions regarding research data, this policy should be interpreted in accordance with those provisions. In the event of inconsistency between a sponsored research agreement and this policy, the university's obligations under the sponsored research agreement will prevail.[1216]

In terms of the legal impediments, UW Policy states that, research data must be maintained in compliance with all applicable University policies, state and federal laws and contractual requirements, including without limitation those pertaining to human subjects and confidentiality.[1217] The policy further states that confidentiality of research data must be maintained if the underlying research utilised human subjects and the research data includes identifiable data and/or coded data for which the master list linking the code to subject identifiers still exists.[1218]

2. Cornell University Research Data: Recording, Retention and Access Policy 2007

The Cornell University Research Data: Recording, Retention and Access Policy 2007 (CU Policy) was last revised in January 2007. CU Policy states that researchers and the college share an obligation to appropriately record research data, archive data for a reasonable length of time and make data available for review and possible re-use under appropriate circumstances.[1219]

In terms of the legal impediments, CU Policy states that both research investigators and the college have responsibilities and rights with respect to research data. These include protection of intellectual property rights, enabling appropriate responses to questions about accuracy, authenticity, primacy and compliance with laws and regulations governing the conduct of research, and responding to the legitimate interests of research sponsors and governmental agencies.[1220]

1215 Ibid [II.1] Applicability and Administration.

1216 Ibid [II.3] Sponsored Research Agreements.

1217 Ibid [IV.2] Preservation of Research Data – Maintenance of Research Data, Sponsored Research Agreements.

1218 Ibid [V.3] Transfer of Research Data from the University - Confidentiality of Human Subjects Data, Sponsored Research Agreements.

1219 CU Research Data: Recording, Retention and Access Policy 2007, Reason for Policy.

1220 Ibid Overview of Research Data Recording, Retention and Access Policy.

3. Virginia Commonwealth University Research Data Ownership, Retention and Access Policy 2009

The Virginia Commonwealth University Research Data Ownership, Retention and Access Policy 2009 (VCU Policy) was approved by the University's Board of Visitors on 15 May 2009. VCU Policy states that the University considers sharing of research data to be a tenet of the scientific community. Further according to VCU Policy, standards of data sharing have been published by national scientific organisations and by federal funding agencies such as the National Academies Press (Sharing Publication-Related Data and Materials: Responsibilities of Authorship in the Life Sciences), the National Institutes of Health (NIH Data Sharing Policy) and the National Science Foundation (NSF General Grant Conditions). VCU Policy further states that scientific and scholarly publications increasingly include statements that promote data sharing in their instructions to authors. [1221]

VCU Policy defines "research data" as recorded information, regardless of form or the media in which it may be recorded, which constitute the original observations and methods of a study and the analyses of these original data that are necessary for reconstruction and evaluation of the report(s) of a study made by one or more investigators. The term "investigator" under VCU Policy means any university member engaged in the conduct of research as either an employee or student of the university or any person using facilities owned or operated by or resources administered by the university.[1222] The "university member" includes any full-time or part-time faculty member, classified employee, administrative staff member, paid student assistant, student, volunteer, fellow or trainee, visiting faculty member or researcher of the university.[1223]

VCU Policy also states that research data differs among disciplines and may include but is not limited to technical information, computer software, laboratory and other notebooks, printouts, worksheets, other media, survey, memoranda, evaluations, notes, databases, clinical case history records, study protocols, statistics, findings, conclusions, samples and physical collections. Research data also includes other

[1221] VCU Research Data Ownership, Retention and Access Policy 2009 - Access to Research Data.
[1222] Ibid Definition: Investigator,
[1223] Ibid Definition: University Member.

supporting materials created or gathered in the course of the research, tangible research property, unique research resources such as synthetic compounds, organisms, cell lines, viruses, cell products and cloned DNA. Also included as research data are genetic sequences and mapping information, crystallographic coordinates, plants, animals and spectroscopic data, and other compilations formed by selecting and assembling pre-existing materials in a unique way.[1224]

In terms of the legal impediments, VCU Policy states that information or data that would violate the confidentiality of sources or subjects involved in the research shall not be disclosed except in accordance with law or regulation.[1225] VCU Policy further states that data is to be shared in reasonable but limited quantities with members of the research community for non-commercial purposes. [1226]

4. University of New Hampshire Ownership and Management of Research Data Policy.

The University of New Hampshire Ownership and Management of Research Data Policy (UNH Policy) can be found in Part VIII.C of the University's Research Policies. UNH Policy, which was last updated on 9 February 2007, states that in keeping with its commitment to promote integrity in the scholarly process, the university's research data management practices should ensure open and timely access to research data. Such access is especially vital with respect to questions about compliance with legal or regulatory requirements governing the conduct of research, accuracy or authenticity of data, primacy of findings and reproducibility of results.[1227] UNH Policy further states that the university's responsibility for stewardship of research data, including access to data, is derived from the Office of Management and Budget (OMB) Circular A-110, Subpart C.53.[1228]

UNH Policy defines "research data" as recorded information necessary for the reconstruction and evaluation of reported results of research and the events and processes leading to those results, regardless of the form or the media on which it may be recorded. Under UNH Policy, technical data, project progress reports, final

1224 Ibid Definition - Research Data.
1225 Ibid Access to Research Data.
1226 Ibid.
1227 UNH Ownership and Management of Research Data Policy 2007, Clause 1 – Introduction.
1228 Ibid.

project reports and computer software are also part of research data.[1229] UNH Policy also provides examples of research data which include, but are not limited to, the following:

i. Raw numbers and field notes or observations, detailed experimental protocols, procedures for data analysis and/or reduction, and data obtained from instrumentation, interviews, or surveys;
ii. Computer files and databases, research notebooks or laboratory journals, tables, charts, slides, videotapes, sound recordings, and photographs;
iii. Physical collections, biological specimens, cell lines, derived reagents, marine life, drilling core samples, genetically-altered microorganisms or other tangible artifacts.[1230]

UNH Policy states that the university, in acknowledging the importance of data sharing in the advancement of knowledge and education, recognises two categories of sharing research data. Firstly, internal, where research data is shared with other university personnel for research or scholarly purposes.[1231] Secondly, external, where research data is shared upon a requirement by external sponsors that data gathered in the course of research supported with their funds be shared in a timely manner with qualified individuals in the scientific community, after the associated research results have been published or provided to the sponsor. [1232]

In terms of the legal impediments, UNH Policy states that research data created by university investigators may be shared for research or scholarly purposes with other university personnel when such sharing is not limited by written agreement, policy, or regulation.[1233] Further, according UNH Policy, when data sharing is not governed by another written agreement or an applicable policy or regulation, research data created by university investigators may be shared with a broad scientific or educational audience.[1234]

1229 UNH Ownership and Management of Research Data Policy 2007, Clause 2.3 – Research Data.
1230 Ibid [2.3.1] Research Data.
1231 Ibid [9.1] Sharing Research Data – Internal.
1232 Ibid [9.2] Sharing Research Data - External.
1233 Ibid [9.1] Sharing Research Data: Internal.
1234 Ibid [9.2] Sharing Research Data: External.

5. University of Tennessee Research Data Policy

The University of Tennessee Research Data Policy (UT Policy) protects the faculty's and university's property rights by addressing definition, responsibility, control, and distribution of research data produced during activities supported by the university, external sponsors or produced with University facilities, resources or personnel.[1235] UT Policy defines "research data" as all records necessary for the reconstruction and evaluation of reported results of research and the events and processes leading to those results, regardless of form or media. Under UT Policy, research data may include laboratory notebooks, databases documenting research, and other compilations of information developed during research. Further according to UT Policy, research data may be associated with intellectual property such as patent, copyright works and trademarks.[1236]

UT Policy is applicable to research data developed by university employees in performing the duties of their employment by the university or through substantial use of funds and facilities provided by the university. UT Policy assures that research data are adequately recorded, archived, retained, and accessible for sufficient time to support the associated research that produced the data and any intellectual property developed by that research. UT Policy supports the academic freedom for free and broad dissemination of research data, consistent with university policy and needs.[1237]

UT Policy further states that the university supports the principle of openness in research. Free dissemination of data, processes, and results of research and other sponsored activity is crucial to a vibrant and healthy academic environment. [1238] In terms of the legal impediments, UT Policy states that the principal investigator is responsible for controlling storage, use, and distribution of research data arising from the research activity, subject to provisions of the applicable grant, contract, other agreement, university policy or applicable law.[1239]

1235 UT Research Data Policy, Objectives, [1].
1236 Ibid [2] Definition of Research Data.
1237 Ibid [1] Objectives.
1238 Ibid [4] Control of Research Data.
1239 Ibid [4] Control of Research Data.

7.3 COMPARATIVE ANALYSIS

According to Zweigert and Kötz, the purpose of making a comparative analysis is multi-fold. First, it can help to gain more knowledge which can provide a much richer range of model solutions for preventing or resolving problems.[1240] Second, a critical analysis of what has been discovered from the comparative study can help to find the right solution to the problems investigated.[1241] Where the legal impediments have been resolved by the existing policies of Malaysian public universities, the comparative analysis provides further opportunity for this thesis to find better ways to resolve the legal impediments.[1242] Finally, by conducting a comparative analysis, it can facilitate policy making or further improve the existing policies.[1243]

Gutteridge in his book on comparative legal study and research suggests that the scope of comparison should be determined prior to the comparison.[1244] In this chapter, the scope of comparison is limited to the related provisions in the policies that resolve the legal impediments identified in this thesis. From the preliminary analysis of policies of public research funders that support open access to and re-use of publicly funded research, it is found that ARC and NHMRC policies do not contain a provision which resolves the legal impediments. Similarly, RCUK and EPSRC policies also do not contain any provision that resolves the legal impediments. RCUK and EPSRC policies have left the legal constraints to be resolved by the research organisations' policies or practices.[1245] Among the universities, MU Policy and CU Policy are found not to contain any provision which resolves the legal impediments identified in this thesis. As for other public research funding agencies and universities, their policies contain one or more provisions which resolve the legal impediments identified in this thesis.

1240 Konrad Zweigert and Hein Kötz, *Introduction to Comparative Law* (3rd rev ed, Oxford University Press, Oxford, 1998), 15-16.

1241 Ibid 47.

1242 Terry CM Hutchinson, *Researching and Writing in Law* (2nd ed, Lawbook Co, Pyrmont, NSW, 2006), 106.

1243 Gutteridge, above n 1088, 35.

1244 Ibid 73.

1245 EPSRC Policy on Research Data 2011, [ii] – principles.

Besides the scope of comparison, the criteria of comparison must also be determined.[1246] According to Guttridge, the criteria used in making the comparison are the similarities (their likeness with respect to the issue in question) and differences between the policies which are being compared.[1247] Another criteria of comparison is the special feature or unique approach of the policies under comparison that is proposed by Reitz.[1248] To answer the research question set out in this chapter, the related provisions of the policies and a comparative analysis of their similarities, differences and special feature/unique approach in resolving the legal impediments are produced below.

7.3.1 How did the policies resolve the legal impediments arising from intellectual property protection of research data?

The policy analysis found that there are 17 policies (9 public research funding agencies and 8 universities) that contain provisions relating to the legal impediment arising from the intellectual property protection of research data. The related provisions of those policies are produced in Table 7.3.1 below.

Table 7.3.1 Related provisions on the legal impediments arising from intellectual property protection of research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	QUT Policy requires the researchers to make the research data available to other researchers through open or negotiated access, as appropriate and in accordance with the requirements of research funding bodies such as the Australian Research Council and the National Health and Medical Research Council, for as long as there is interest in the data. (Roles and Responsibilities, [2.8.4])
	Research datasets should generally be made available *via* open access or controlled access with research partners, collaborators or requestors, for re-use by other researchers, unless a case based on specific and valid reasons is made for not doing so. (Access and Re-use, [2.8.5(g)])
GU Policy	Research data should normally be made available to be shared with the wider community wherever possible (Principles- Sharing of Research Data, [1.3])
UNA Policy	Research data and primary materials should be made available for use by other researchers for further research unless precluded by the conditions under which they were obtained, privacy or confidentiality matters. (Access to Research Data and Primary Materials, [7])

1246 Gutteridge, above n 1088, 73.
1247 Ibid 35.
1248 John C Reitz, 'How to Do Comparative Law' (1998) 46 *American Journal of Comparative Law* 617.

MRC Policy	Publicly funded research data are a public good, produced in the public interest, and that they should be openly available to the maximum extent possible. (MRC Policy on Data Sharing and Preservation)
	MRC expects valuable data arising from MRC-funded research to be made available to the scientific community with as few restrictions as possible. The MRC also expects such data to be shared in a timely and responsible manner (Policy Statement)
BBSRC Policy	BBSRC considers intellectual property protection should not unduly delay or prevent data sharing (BBSRC Data Sharing Policy Statement)
	Research data to be made available with as few restrictions as possible in a timely and responsible manner to the scientific community for subsequent research through existing community resources or databases where possible (BBSRC Data Sharing Policy Statement)
NERC Policy	The environmental data produced by the activities funded by NERC will be made openly available for others to use. NERC will supply the environmental data it holds for free, apart from a few special cases as detailed in the policy. (Key Principles)
	All data held by the NERC Environmental Data Centres will be supplied for free except for large or complex requests where NERC may charge the cost of supply, or where third-party licence conditions either prevent such free supply, or require us to make specific charges.(Access to Data, [1])
	In the majority of cases, environmental data provided by the NERC data centres will be supplied for free, however there are some exceptions. To support provision of equal access to all users, where a request is large or complex the data centres will make an appropriate administrative charge on a cost recover basis. A large or complex request is where a significant amount of manual intervention is required from data centre staff, or data are required on non-standard media or in a non-standard format. (NERC Data Policy - Guidance Notes, Charges for Data, [3(d)])
	Those funded by NERC who do not meet these requirements risk having award payments withheld or becoming ineligible for future funding from NERC. (Data Collection, [15])
ESRC Policy	ESRC requires research data arising from ESRC funded research to be made available to the scientific community in a timely and responsible manner. ESRC award holders are expected to make use of existing standards for data management and to make data available for further re-use. (ESRC's Policy Statement, [1.2(6)])
	The grant holders are responsible to ensure that they meet the requirements of the ESDS for preparation for re-use and archiving without delay. (Clause 2.3.2, Responsibilities of ESRC Grant Holders, [23])
CRUK Policy	Data arising from the research that CRUK funds should be managed and made available as widely and freely as possible to maximise public benefit. Such data must be shared in a timely and responsible manner. ([2])
UE Policy	Research data management plans must ensure that research data are available for access and re-use where appropriate and under appropriate safeguards. (Policy, [7])
NIH Policy	All data should be considered for data sharing. (Goals of Data Sharing)
NSF Policy	Investigators are expected to share with other researchers, at no more than incremental cost and within a reasonable time, the primary data,

	samples, physical collections and other supporting materials created or gathered in the course of work under NSF grants. (NSF Data Sharing Policy 2011)
	NSF normally allows grantees to retain principal legal rights to intellectual property developed under NSF grants to provide incentives for development and dissemination of inventions, software and publications that can enhance their usefulness, accessibility and upkeep. Such incentives do not, however, reduce the responsibility that investigators and organizations have as members of the scientific and engineering community, to make results, data and collections available to other researchers. (Dissemination and Sharing of Research Results, Chapter VI: Other Post Award Requirements and Considerations, NSF Award and Administration Guide 2011, [D.4(d)])
EAR Policy	It is the responsibility of researchers and organizations to make results, data, derived data products, and collections available to the research community in a timely manner and at a reasonable cost. In the interest of full and open access, data should be provided at the lowest possible cost to researchers and educators. This cost should, as a first principle, be no more than the marginal cost of filling a specific user request. (Dissemination and sharing of research results, [3])
	Data may be made available for secondary use through submission to a national data center, publication in a widely available scientific journal, book or website, through the institutional archives that are standard for a particular discipline (eg IRIS for seismological data, UNAVCO for GPS data), or through other EAR-specified repositories. (Dissemination and sharing of research results, [4])
CDC/ATDSR Policy	All data should be released as soon as feasible without compromising privacy concerns, federal and state confidentiality concerns, proprietary interests, national security interests, or law enforcement activities. (Data Covered by this Policy, [III])
	CDC expects researchers who are supported by CDC funding to make their data available for analysis by other public health researchers. Awardees who fail to release data in a timely fashion will be subject to procedures normally used to address lack of performance (eg, reduction in funding, restriction of funds, or grant termination). Researchers who contend that the data they collect or produce are not appropriate for release must justify that contention in their applications for CDC funds. (Implementation of CDC's Data Release/Sharing Policy - Obligations of grantees, contractors, and partners, [VIII])
UW Policy	The Principal Investigator ("PI") has an obligation to share data and specimens with his/her research project co-investigators during and after completion of the project, except when such sharing would lead to overlap of effort, reduction in finite specimen resources that would seriously limit the PI's future use, or where confidentiality agreements or IRB restrictions limit the sharing of specimens or other data.(Ownership and Stewardship – Access, [III.4])
VCU Policy	University Members are expected to share their published data upon request. Sharing of data should occur in a timely manner and involve only necessary costs. (Access to Research Data)
UNH Policy	Reasonable access to research data should normally be available to any member of the University research group in which the data were collected, when such access is not limited otherwise by written agreement, policy, or regulation. Non-University collaborators are entitled to access the data they helped create. (Accessing Research Data, [8.1])

	When data sharing is not governed otherwise by another written agreement or an applicable policy or regulation, research data created by University Investigators may be shared with a broad scientific or educational audience. (Sharing Research Data – External, [9.2])
UT Policy	The University supports the principle of openness in research. Free dissemination of data, processes, and results of research and other sponsored activity is crucial to a vibrant and healthy academic environment. The University promotes the prompt and open exchange of Research Data with scientific colleagues outside the investigator's immediate laboratory or department, subject to relevant grants, contracts, other agreements or law. (Control of research data, [4])

In terms of similarities, all the above policies make it the responsibility of the grantees/researchers/research organisations/principal investigator/university members to make available/release/share/disseminate the research data. Three policies make it mandatory for the research data to be made available/released/shared/disseminated by using the term "require" (QUT/ESRC) or "must" (UE). Eight policies (GU/UNA/MRC/BBSRC/CRUK/NIH/CDC/UNH) make it optional for data to be made available/ released/shared/disseminated by using the term "should" or "expect" (NERC/NSF).

Seven polices require the research data to be made available/released/shared/disseminated promptly (UT), in timely manner (MRC/BBSRC/ESRC/CRUK), within a reasonable time (NSF), or as soon as feasible (CDC/ATDSR). Five policies (MRC/BBSRC/ESRC/CRUK/NSF) require the research data to be made available/released/shared/disseminated in a responsible manner. One policy (NERC) makes it clear research data is made available for free, while other policies (EAR) allow research data to be made available at the lowest possible cost or at no more than incremental cost (NSF) or marginal cost (EAR). There is also a policy (NERC) that will charge if the research data is large or complex or is requested to be made available in non-standard format.

In terms of differences, several policies limit data users to research partners, collaborators, requestors (QUT), other researchers (NSF), research community (UNH/UW/CDC/EAR/UT), scientific community (MRC/BBSRC/ESRC) or educational audience (UNH). In contrast, there are policies which require the research data to be made available to the wider community (GU). Also, there is a

policy that requires the research data to be made openly available for others to use without specifying the identity of these "the others"(NERC). There are four policies that do not specify to whom the research data is to be made available (CRUK/UE) or shared (NIH/VCU).

In terms of special feature/unique approach, QUT/CDC/ATDSR policies require specific and valid reasons to be given by university researchers for not making available/releasing/sharing/disseminating research data. CDC/ATDSR Policy will subject the awardees (grant holders) who fail to release research data to procedures normally used to address lack of performance (eg, reduction in funding, restriction of funds, or grant termination). In NERC Policy, those who do not meet NERC open access requirement risk having award payments withheld or becoming ineligible for future funding from NERC.

7.3.2 How did the policies resolve the legal impediments arising from ambiguity about ownership of research data?

The policy analysis found that there are 10 policies (3 public research funding agencies, 7 universities) which contain provision relating to the legal impediments arising from ambiguity about ownership of research data. The related provisions of the policies are produced in Table 7.3.2 below.

Table 7.3.2 Related provisions on the legal impediments arising from ambiguity about ownership of research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	Research data generated by QUT staffs and research students is subject to the University's Intellectual Property Policy. (Policies and Protocols Relating to Ownership of Research Data at QUT, [2.2])
	QUT owns the intellectual property generated by staff in the course of their employment. (Policies and Protocols Relating to Ownership of Research Data at QUT - QUT Staff, [2.2.2].
	Collaboration agreements with external organizations may have an impact on ownership of copyright in research data. At the commencement of any collaborative research project, parties should reach an agreement on matters of ownership. This agreement which should be in writing, should cover ownership of any intellectual property that is produced, including copyrighted material. An agreement will help resolve any conflicts over ownership of research data that may arise later in the project. Generally, the University reserves the right to keep copies of data generated as a result of collaborative research. Policies and Protocols Relating to Ownership of Research Data at QUT - Collaboration Agreements, [2.2.3])
UNA Policy	Unless owned by a third party, research data and primary materials

	acquired through research will be owned by the university researcher undertaking the research. Ownership of Research Data and Primary Materials, [4])
	Where projects span several institutions an agreement will be developed at the outset covering the ownership of research data and primary materials and components thereof in accordance with the Research Collaboration and Contract Guidelines. The University will remain the custodian of research data and primary materials acquired through research in accordance with this policy and the Research Data and Materials Management Procedure unless data and materials are owned by a third party or are subject to a formal collaborative agreement. (Ownership of Research Data and Primary Materials, [4])
BBSRC Policy	Ownership of the data generated from the research that BBSRC funds resides with the investigators and their institutions. (BBSRC's Position)
NERC Policy	Intellectual property rights (IPR) in the data that a researcher generates depends on who a researcher works for and their contract of employment. It is normally the employer of the researcher that owns the IPR. If the researcher work for a university, the majority of the time, the IPR will belong to the university, but, this does depend on the researcher's contract of employment. (NERC Data Policy , Guidance Notes - Intellectual Property Rights, [4(f)])
ESRC Policy	Unless stated otherwise, the ownership of intellectual property rests with the organisation carrying out the research. (Introduction, [1]. See also, Intellectual Property Rights, [2.5.1(35)])
	Where research is funded by or undertaken in collaboration with others, the research organisation is responsible for putting appropriate formal agreements in place covering contributions and rights of the various organisations and individuals involved. Such agreements must be in place before the research begins. (Intellectual Property Rights, [2.5.1(36)])
UE Policy	Any assertion of intellectual property rights to data should be made clear at the outset of any research project and should explicitly form part of any collaboration or partnership agreement and Data Management Plan. (Data Ownership and Control, [7])
UW Policy	All Research Data is owned by the University, except as otherwise provided by an agreement with a third party, a law, or University policy, such as copyright policy. (Ownership and Stewardship - University Ownership, [III.1].)
VCU Policy	Consistent with federal policy and prevailing higher education practice, Research Data belong to the University. (Ownership of Research Data and University Disposition)
UNH Policy	A Principal Investigator or Other Investigator shall own any research data generated for research projects/activities s/he initiates unless the Investigator performed the research project/activity while supported by University-administered funds in the form of salary, wages, or stipend, including externally-sponsored funds (Ownership and Custody - Faculty or Staff Principal Investigator (PI) or Other Investigator, [5.1.1].)
	The University shall own all research data generated by a Student Investigator for research projects/activities where the Student Investigator performed the research project/activity while supported by University-administered funds in the form of salary, wages, or stipend, including externally-sponsored funds (Ownership and Custody – Student Investigator, [5.2.1])

	The University is the legal owner of the research data by virtue of a prevailing sponsored research, material transfer, confidential disclosure, or other legally binding written agreement accepted in the University's name on behalf of the Student or Sponsoring PI. (Ownership and Custody - Student Investigator, [5.3.4])
	The University automatically assigns custody of all University-owned research data to the PI, Other Investigator, or Sponsoring PI (for students), as applicable, who carries out her/his custodial responsibilities in accordance with this policy. (Ownership and Custody – Custody, [5.3].)
UT Policy	Questions of Research Data ownership or other matters pertaining to the Research Data policy will be resolved by the Chief Research Officer in conformance with applicable University policies. (Resolving Disputes Concerning Research Data Ownership or Policy, [8])
	When necessary to assure access to Research Data, the University has the option to take custody of the data in a manner specified by the Chief Research Officer. (University Access, UT Policy, [9])

In terms of similarities, none of the policies clarify all five areas of ambiguity about ownership of publicly funded research data created by: i) a university employee in the course of employment; ii) a university employee outside the course of employment; iii) a non-employee university researcher; iv) a university student; and v) a university researcher under research collaboration with a non-university researcher.

In terms of differences, one policy (QUT) provides that ownership of research data is subject to the university's intellectual property policy. One policy (NERC) makes it clear that ownership of research data generated by researchers depends on who the researchers work for and the researchers contract of employment. Two policies (BBSRC/UNH) clearly state that ownership of research data which is funded by the university (BBSRC) or university administered funds (UNH) is vested in the University. One policy (BBSRC) vests ownership of research data that it funds, in both the investigators and their institutions. One policy (UNH) vests ownership of research data created by students using university-administered funds, in the university. Three policies vest ownership of research data created under research collaboration in accordance to research collaboration and contract guidelines (UNA) and written agreements (ESRC/UW).

Three policies (QUT, UNA, ESRC) require written/appropriate formal agreement on matters of/covering the ownership of research data of various research organisations

and individuals involved, to be made at the commencement of any collaborative research project/before the research begins. In terms of special feature/unique approach, UNH policy automatically assigns custody of all University-owned research data to the principal investigator/investigator or students, who carries out her/his custodial responsibilities in accordance with the policy.

7.3.3 How did the policies resolve the legal impediments arising from a data owner's exclusive rights in research data?

The policy analysis found that there are 10 policies (8 public research funding agencies and 2 universities) which contain provisions relating to the legal impediments arising from data owner's exclusive rights in research data. The related provisions of those policies are produced in Table 7.3.3 below.

Table 7.3.3 Related provisions on the legal impediments arising from a data owner's exclusive rights in research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	Research data from publicly funded research projects (such as by the ARC and NHMRC) must be placed into an institutional repository, usually within six months of publication. (Management of Research Data and Primary Materials – Access and Re-Use, [2.8.5(g)])
MRC Policy	A limited, defined period of exclusive use of data for primary research is reasonable, according to the nature and value of the data and the way the data are generated and use. (Policy Statement)
BBSRC Policy	Researchers have a legitimate interest in benefiting from their own time and effort in producing the data but not in prolonged exclusive use of these data. The timescales for data sharing will be influenced by the nature of the data but it is expected that timely release would generally be no later than the release through publication of the main findings and should be in-line with established best practice in the field. Where best practices does not exist, release within three years of generation of the data set is suggested as a guide. (BBSRC Data Sharing Policy Statement)
NERC Policy	The requirement to deposit data with a NERC data centre does not affect intellectual property rights. (Intellectual Property Rights, NERC Data Policy - Guidance Notes, [4(f)])
	Data from NERC funded activities are provided to the data centres on a non-exclusive basis without prejudice to any intellectual property rights. This is to enable NERC to manage and make openly available publicly funded research data. (Data Collection, [14])
	Where NERC does not own the IPR, the rights owner will be required to grant to NERC a non-exclusive licence to allow NERC to manage and supply the data for re-use. NERC is developing a 'Data Deposit Licence' which will form the basis of this rights assignment process. (NERC Data Policy, Guidance Notes - Intellectual Property Rights, [4(f)])

	To protect the research process, NERC will allow those who undertake NERC-funded work a period to work exclusively on, and publish the results of, the data they have collected. This period will normally be a maximum of two years from the end of data collection. (Access to Data)
	A key reason to restrict access is to protect the research process by allowing researchers a reasonable amount of time to work-up their data sets and publish their findings. This is known as an embargo period. NERC considers that, in most cases, a reasonable embargo period is a maximum of two years from the end of data collection. (NERC Data Policy, Guidance Notes – Embargo Periods, [3(a)(ii)])
	NERC will allow researchers a reasonable amount of time to work-up their data sets and publish their findings. This is known as an "embargo period", and NERC considers that, in most cases, a reasonable embargo period is a maximum of two years from the end of data collection. However, in exceptional circumstances, a longer period may be applicable, for example if it can be justified by the requirements of the research. The specific embargo period must be agreed in advance with the data centre. An embargo period starts from the end of data collection. It is not from the point at which the data were submitted to the data centre or the end of the NERC-funded project. Once an embargo period has expired the data are available to anybody to use for whatever purpose. (NERC Data Policy - Guidance Notes- Embargo Periods, [4(c)])
ESRC Policy	The ESRC grant holders are responsible to formally offer any data created or repurposed during the lifetime of the award to the ESRC Economic and Social Data Service (ESDS) within three months of the end of the award. (Clause 2.3.2, Responsibilities of ESRC grant holders, [23])
CRUK Policy	A limited period of exclusive use of data for primary research is reasonable, according to the nature and value of the data and the way they are generated and used. ([3])
	Although CRUK expects that data sharing should occur in a timely manner, it also acknowledges that the investigators who generated the data have a legitimate interest in benefitting from their investment of time and effort. CRUK therefore supports the initial investigator having a reasonable period of private use of the data but not prolonged exclusive use. (Timeframe for Data Sharing)
	CRUK expects data to be released no later than the acceptance for publication of the main findings from the final dataset (unless restriction from third party agreements or intellectual property protection still apply) or on a timescale in line with the procedures of the relevant research area. (Timeframe for Data Sharing)
	With experiments carried out over an extended period of time, it is reasonable to expect that subsets of data analysed by the investigator(s) be made available for sharing. The investigator can then continue to benefit from further reasonable periods of exclusive analysis while the dataset as a whole matures.(Timeframe for Data Sharing)
UE Policy	The University urges researchers to make their data open once research is published or after an agreed embargo period. (Data Ownership and Control, [7])
	A non-exclusive licence for the University to hold, manage and preserve the data is essential and a non-exclusive licence to make the data available is highly desirable. (Data Ownership and Control, [7])
NIH Policy	NIH recognises that the investigators who collected the data have a legitimate interest in benefiting from their investment of time and effort. NIH continues to expect that the initial investigators may benefit from

	first and continuing use but not from prolonged exclusive use. (Timeliness of Data Sharing)
	NIH expects the timely release and sharing of data to be no later than the acceptance for publication of the main findings from the final dataset. The specific time will be influenced by the nature of the data collected. Data from small studies can be analysed and submitted for publication relatively quickly. If data from large epidemiologic or longitudinal studies are collected over several discrete time periods or waves, it is reasonable to expect that the data would be released in waves as data become available or main findings from waves of the data are published. (Timeliness of Data Sharing)
EAR Policy	For those programs in which selected principle investigators have initial periods of exclusive data use, data should be made openly available as soon as possible, but no later than two (2) years after the data were collected. This period may be extended under exceptional circumstances, but only by agreement between the Principal Investigator and the National Science Foundation. For continuing observations or for long-term (multi-year) projects, data are to be made public annually. (Dissemination and sharing of research results, [5])
CDC/ATDSR Policy	Data that CDC collects or holds and that can be legally released to the public should be released through a public-use data set within a year after the data are evaluated for quality and shared with any partners in data collection. (Clause VII, How to Release Data – Release of data for public use)

In terms of similarities, all the above policies restrict a data owner's exclusive rights in research data. The restriction is imposed by requiring the research data to be deposited in an institutional/open access repository after a limited period/embargo which limits the exclusive use/private use of research data. Nine policies (QUT/BBSRC/NERC/ESRC/CRUK/UE/NIH/EAR/CDC/ATDSR) provide a cut off date for the restriction to take place. One policy (MRC) does not provide any cut off date.

In terms of differences, the cut off date varies between one policy to another ranging from within 6 months of publication (QUT), no later than the release through publication of the main findings (BBSRC), two years from the end of data collection (NERC), within three months of the end of the award (ESRC), no later than the acceptance for publication of the main findings from the final dataset (CRUK/NIH), no later than two years after the data were collected (EAR), or within a year after the data is evaluated for quality and shared with any partners in data collection (CDC/ATDSR). In terms of special feature/unique approach, NIH Policy requires research data from large epidemiologic or longitudinal studies to be released in

waves as data becomes available or main findings from waves of the data are published.

7.3.4 How did the policies resolve the legal impediment arising from the restrictive scope of the legitimate of use of research data?

The policy analysis found that there are 4 policies of public research funding agencies which contain provisions relating to the legal impediments arising from the restrictive scope of the legitimate use of research data. The related provisions of those policies are produced in Table 7.3.4 below.

Table 7.3.4 Related provisions on the legal impediments arising from the restrictive scope of the legitimate use of research data

THE POLICIES	RELATED PROVISIONS
MRC Policy	One of the best ways of making a better use of the research data is to ensure that data are properly preserved for sharing and informed use beyond the originating research teams. (Principles for Access to and Use of MRC Funded Research Data)
NERC Policy	NERC expects everyone that it funds to manage the data that they produce in an effective manner for the lifetime of their project, and for these data to be made available for others to use with as few restrictions as possible, and in a timely manner. (Data Collection)
	Anyone is allowed to access NERC funded data, regardless of the purpose for which they intend to use them, including commercial gain. In general, all data made available by the NERC Data Centres can be accessed by anyone for any purpose. (NERC Data Policy, Guidance Notes - Restrictions to Access, [3(a)])
ESRC Policy	ESRC encourages the re-use of existing research data for secondary analysis which is currently provided free to academic users through a number of data service providers. (ESRC's Policy Statement, [1.2(8)])
	ESRC is committed to provide access to research data to enable their future re-use and strengthen the capacity for secondary analysis. The Council supports a number of data service providers that facilitate easy access, dissemination and promotion of existing data sources. (ESRC's Policy Statement, 1.2(11)])
NIH Policy	It is not appropriate for the initial investigator to place limits on the research questions or methods other investigators might pursue with the data. It is also not appropriate for the investigator who produced the data to require co-authorship as a condition for sharing the data. (Human Subjects and Privacy Issues)

From the four policies, only one policy (NERC) allows the right to use beyond the fair dealing exceptions by allowing anyone access the research data, regardless of the purpose for which they intend to use them, including commercial gain. As there is no

other policy with similar provision, the similarities/differences between the policies and special features/unique approach of the policies cannot be compared.

7.3.5 How did the policies resolve the legal impediments arising from complex and lengthy licensing procedures for research data?

The policy analysis found that there are 3 policies (1 public research funder and 2 universities) which contain provisions relating to the legal impediments arising from complex and lengthy licensing procedures of research data. The related provisions of those policies are produced in Table 7.3.5 below.

Table 7.3.5 Related provisions on the legal impediments arising from complex and lengthy procedures for research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	Research data should normally made available under open access licence, such as a Creative Commons licence or by negotiated or controlled access through a system of permissions and authentication. (Access and Re-Use, [2.8.5(g)])
	'Open Content' licences such as Creative Commons (CC) Licences, facilitate open access and re-use as it frees the end-user from having to contact the data owner to ask for permission. The most liberal CC licence reserves only the right to be attributed as the owner. Other CC licences reserve this right (attribution) and specify one or more conditions which apply to end users. For example, 'non-commercial' use only, 'no derivatives' allowed or must 'share-alike'. (Types of Licenses, [8.3.2])
NERC Policy	All environmental data made by the NERC Environmental Data Centres will be accompanied by a data licence. Data originally provided to NERC by a third-party may have their own access and licence conditions which restrict how or when NERC can make data available to others, in which case NERC data licence conditions will reflect these. (Access to Data, [4])
	Data supplied by the NERC data centres will be accompanied by a data licence. A data licence is an agreement between NERC and data user; it outlines any limitations on how the data may be used, how the source/creator of the data must be acknowledged and the limits of NERC's liability for the data it provides. NERC data licences are based on the UK Open Government Licence for Public Sector Information. (NERC Data Policy, Guidance Notes - Data Licences, [3(b)])
UE Policy	Where researchers seek to make their research products open, explicit devices such as the Creative Commons Attribution licence (for Creative Works such as text and multi-media documents) should be used. For data, a licence such as the Creative Commons CC0 waiver, or the Open Data Commons Public Domain Dedication and Licence (ODC-PDDL) should be used. These licences will make the situation clear to potential re-users; the absence of licence may mean resources are not re-used and hence do not get cited. Licences with a "Non-commercial" restriction may seem attractive but should be avoided where possible, as they severely limit re-usability. (Data Ownership and Control, [7])

In terms of similarities, all the above policies require licensing procedures that simplify access to and re-use of publicly funded research data to be adopted. In terms of differences, two policies adopt Creative Commons (CC) Licences (QUT, UE), which range from the most liberal CC licence (attribution) to a more restrictive one (non-commercial, no derivatives, share-alike). The UE Policy expressly states that licences with a "Non-commercial" restriction should be avoided where possible, as they severely limit re-usability. One policy (NERC) adopts the UK Open Government Licence for Public Sector Information. As for special feature/unique approach, UE Policy recommends CC0 Waiver and Open Data Public Domain Dedication and Licence (ODC-PDDL) to be used to open up the research data.

7.3.6 How did the policies resolve the legal impediments arising from an author's moral right of integrity?

The policy analysis found that there are 4 policies of public research funding agencies which contain provisions relating to the legal impediments arising from an author's moral right of integrity. The related provisions of those policies are produced in Table 7.3.6 below.

Table 7.3.6 Related provisions on the legal impediments arising from an author's moral right of integrity

THE POLICIES	RELATED PROVISIONS
BBSRC Policy	Those enabling sharing should receive full and appropriate recognition by funders, their academic institutions and new users for promoting secondary research. (BBSRC Data Sharing Policy Statement)
	Where the research data are made available for re-use, BBSRC supports the view that those enabling sharing should receive full and appropriate recognition by funders, their academic institutions and new users for promoting secondary research. Where data are shared through a third party resource or databases, secondary users should acknowledge the source of data. (Secondary Use of Data, Policy Implementation 1: Integrating Data Sharing into Existing Support and Monitoring Processes)
NERC Policy	All those who use data provided by NERC are required to acknowledge the source of the data. (Access to Data, [6])
	Those who use data supplied by NERC must acknowledge in any publication or any other derived work, the contribution made by those who have created and worked up the data. The NERC data licence will contain information on how best to do this. (NERC Data Policy, Guidance Notes – Acknowledgement, [3(c)])

	All data supplied by NERC will be accompanied by a data licence. This licence will specify that users of the data must acknowledge the originator of the data in any publication or other derived work. However, NERC cannot guarantee that users of the data will do this. (NERC Data Policy, Guidance Notes Clause - Acknowledgement, [4(h)])
ESRC Policy	ESRC emphasises the responsibilities that data sharing places upon those who plan to re-use existing data for research purposes. Where such data sharing leads to publication of related research findings in any format, full and appropriate acknowledgment, via citation, should be made of data sources. (ESRC's Policy Statement, [1.2(12)])
CRUK Policy	Data sharers should receive full and appropriate recognition by funders, their academic institutions and new users for promoting secondary research. ([5])
	Researchers using shared data are expected to acknowledge the investigators who generated the data upon which any published findings are based. (Data Acknowledgement)

None of the policies reconcile an author's moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data. Therefore, the similarities/differences between the policies and special feature/unique approach of the policies in resolving the legal impediment arising from author's moral right of integrity cannot not be compared.

7.3.7 How did the policies resolve the legal impediments arising from non-disclosure duty of confidential research data?

The policy analysis found that there are 4 policies (3 public research funding agencies and 1 university) that contain provisions relating to the legal impediments arising from duty of non-disclosure of research data which contains confidential information. The related provisions of those policies are produced in Table 7.3.7 below.

Table 7.3.7 Related provisions on the legal impediments arising from non-disclosure duty of confidential research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	Secret or confidential information can be protected from unauthorised access by use of technical mechanisms such as encryption and passwords or legal mechanisms such as a confidentiality agreement. A confidentiality agreement (also known as non-disclosure agreements) should be used where researchers wish to share confidential data on the understanding that it will not be further disclosed or used for purposes other than those covered by an agreement. (Confidentiality, [6.2])

ESRC Policy	Where research data are considered confidential or contain sensitive personal data, award holders must seek to secure consent for data sharing or alternatively anonymise the data in order to make sharing possible. (Clause 2.4, Sharing Sensitive Data – Joint Responsibilities, [32.)
CRUK Policy	In most instances, sharing data should be possible without compromising the confidentiality of participants. If there are circumstances where data needs to be restricted due to the inability to protect confidentiality, this should be addressed in the data management and sharing plan. (Research Involving Human Participants)
CDC/ATDSR Policy	When data have formal confidentiality protection, CDC's policy is to share those data only under conditions that are consistent with the conditions under which the data were collected. (Guidance for CIOs, Formal confidentiality protection for research subjects, [VI])
	When data have formal confidentiality protection, CDC's policy is to share those data only under conditions that are consistent with the conditions under which the data were collected. It is CDC's responsibility to ensure that inadvertent disclosure does not occur. (Guidance for CIOs - Formal confidentiality protection for research subjects, [VI])
	CDC recommends that data be released in the form that is closest to microdata and that still preserves confidentiality. (How to Release Data, [VII])
	Those assessing the risk that confidential information will be disclosed should recommend the statistical methods to be used for disclosure protection (eg, suppression, random perturbations, recoding, top- or bottom-coding). (Implementation of CDC's Data Release/Sharing Policy - An evaluation of the risk of disclosing private or confidential information, [VIII])
	The recommended methods should balance the risk of disclosure against the possibility that reducing the risk of disclosure will also reduce the usefulness of the data for public health practice and research. (Implementation of CDC'S Data Release/Sharing Policy - An evaluation of the risk of disclosing private or confidential information, [VIII])
	Where data cannot be released publicly, the CDC Policy provides two methods of how data that cannot be released for public use can be released to/shared with third party but with restrictions i.e. Data release through a special-use agreement ii) Data release under controlled conditions. (How to Release Data – Release of Data for Public Use, [VII])
	All release/sharing must be consistent with the confidentiality assurances under which the data were collected or obtained. (Guidance for CIOs - Privacy and Confidentiality, [VI])

In terms of similarities, all the above policies balance the non-disclosure duty of confidential research data with the objective of enabling open access to and re-use of publicly funded research data. In terms of differences, there are various methods of disclosure of confidential data recommended by the policies. The recommended methods are technical mechanisms such as encryption and passwords or legal

mechanisms such as a confidentiality agreement (QUT) or by securing consent for data sharing (ESRC). Also recommended are statistical methods which include suppression, random perturbations, recoding, top or bottom coding (CDC/ATDSR). In terms of special feature/unique approach, CDC/ATDSR Policy requires a specific data release plans to be developed for each data set. This data release plans may include data release through a special-use agreement or data release under controlled conditions which allows non-CDC researchers access to and re-use of identifiable data by extending legal responsibilities to those external researchers.

7.3.8 How did the policies resolve the legal impediments arising from the right to informational privacy of subjects of research data?

The policy analysis found that there are 8 policies (6 public research funding agencies and 2 universities) that contain provisions relating to the legal impediments arising from the right to informational privacy of subjects of research data. The related provisions of those policies are produced in Table 7.3.8 below.

Table 7.3.8 Related provisions on the legal impediments arising from the right to informational privacy of subjects of research data

THE POLICIES	RELATED PROVISIONS
QUT Policy	Data about people should be de-identified before it is shared or published. Quantitative datasets can be de-identified by removing names and addresses or by reducing the level of precision (eg aggregate to a higher level). Special care is needed where access to multiple variables could accidentally disclose the identity of a person (eg workplace plus occupation and age). For qualitative data, names could be replaced with numerical identifiers or pseudonyms.(De-Identifying Research Data, [8.2])
MRC Policy	Risks such as inappropriate disclosure of personal information must be managed in a proportionate yet robust manner. Reference to be made to the MRC Guidelines on Personal Information in Medical Research. In the Guidelines, it is stated that, researchers obtaining information with consent should, wherever possible, anticipate likely needs to archive the data, and to share data sets with other researchers. (Policy Statement)
	Research data sent for re-use outside of the European Economic Area nations, to be anonymised by data custodian. (Re-use of Data by Third Parties)
ESRC Policy	Where research data are considered confidential or contain sensitive personal data, award holders must seek to secure consent for data sharing or alternatively anonymise the data in order to make sharing possible. (Clause 2.4, Sharing Sensitive Data – Joint Responsibilities, [32])
CRUK Policy	Investigators carrying out research involving human participants must ensure that consent is obtained to share information. Furthermore, the necessary legal, ethical and regulatory permissions regarding data

	should be in place prior to disclosing any data. Every effort must be made to protect the identity of participants and prior to sharing, data should be anonymised. In addition, any direct identifiers that may lead to deductive disclosures should be removed to reduce the risk of identification. (Research Involving Human Participants)
NIH Policy	Prior to sharing, data should be redacted to strip all identifiers, and effective strategies should be adopted to minimize risks of unauthorized disclosure of personal identifiers. Stripping a dataset of items that could identify individual participants is referred to by several different terms, such as "data redaction," "de-identification of data," and anonymizing data. In addition to removing direct identifiers, eg, name, address, telephone numbers, and Social Security Numbers, researchers should consider removing indirect identifiers and other information that could lead to "deductive disclosure" of participants' identities. Deductive disclosure of individual subjects becomes more likely when there are unusual characteristics of the joint occurrence of several unusual variables. Samples drawn from small geographic areas, rare populations, and linked datasets can present particular challenges to the protection of subjects' identities. (Human Subjects and Privacy Issues)
	Investigators may use different methods to reduce the risk of subject identification. One possible approach is to withhold some part of the data. Another approach is to statistically alter the data in ways that will not compromise secondary analyses but will protect individual subjects' identities. Alternatively, an investigator may restrict access to the data at a controlled site, sometimes referred to as a data enclave. Some investigators may employ hybrid methods, such as releasing a highly redacted dataset for general use but providing access to more sensitive data with stricter controls through a data enclave.(Human Subjects and Privacy Issues)
	If research participants are promised that their data will not be shared with other researchers, the application should explain the reasons for such promises. Such promises should not be made routinely and without adequate justification. (Human Subjects and Privacy Issues)
	Many research efforts supported by NIH do not include human subjects. Final research datasets from studies that do not include human subjects generally should not be constrained by the limitations deemed necessary and appropriate for human subjects. (Human Subjects and Privacy Issues)
NSF Policy	Privileged or confidential information should be released only in a form that protects the privacy of individuals and subjects involved. General adjustments and, where essential, exceptions to this sharing expectation may be specified by the funding NSF Program or Division/Office for a particular field or discipline to safeguard the rights of individuals and subjects, the validity of results, or the integrity of collections or to accommodate the legitimate interest of investigators. A grantee or investigator also may request a particular adjustment or exception from the cognizant NSF Program Officer. (Dissemination and Sharing of Research Results, [4(b)])
CDC/ATDSR Policy	The goal is to have a policy on data release and sharing that balances the desire to disseminate data as broadly as possible with the need to maintain high standards and protect sensitive information. (Background of Policy)

	Any release or sharing of public health data will acknowledge that data systems are built on trust between the individuals who provide personal data and the agencies that collect those data and that CDC will respect the privacy rights of individuals and others who provide personal or proprietary data. Therefore, all data release/sharing must be consistent with the confidentiality assurances under which the data were collected or obtained. (Guiding Principles)
	CDC recommends that, unless there is a valid public health purpose (eg, a longitudinal study that requires record linkage), programs should not collect nor maintain identifiable data. Identifiable data that are maintained in certain systems of records may only be released in accordance with the Privacy Act which generally permits disclosing such data only with consent. However, the Privacy Act does permit data release without a subject's consent under limited conditions. One example is a release that is compatible with the purpose for which the data were collected. (Guidance for CIOs, Guiding Principals- Privacy and Confidentiality, [VI)
	Before releasing/sharing any data, the data steward must assess the risk that personal information will be disclosed and decide whether some data need to be further de-identified. The Health Insurance Portability and Accountability Act (HIPAA) lists down 18 variables considered as identifiers, that need to be removed to render the dataset de-identified. (Implementation of CDC'S Data Release/Sharing Policy - An evaluation of the risk of disclosing private or confidential information, [VIII])
VCU Policy	Shared data resulting from human subjects research shall be de-identified, with the linkage code residing in the custody of the University Principal Investigator. (Access to research data)

In terms of similarities, all the above policies balance the right to informational privacy with the objective of enabling open access to and re-use of publicly funded research data. In terms of differences, several methods have been used which include de-identification (QUT, NIH, VCU), anonymisation (MRC, ESRC, CRUK, NIH) or removal of direct identifiers (CRUK, NIH). De-identification, anonymisation and removal of direct identifiers in research data are described by the NIH as "data redaction". De-identification of quantitative data is done by removing names and addresses or by reducing the level of precision (eg aggregate to a higher level). Qualitative data is de-identified by replacing names with numerical identifiers or pseudonyms (QUT). In terms of special feature/unique approach, the NIH Policy requires indirect identifiers and other information that could lead to "deductive disclosure" of participants' identities to be removed.

7.3.9 How did the policies resolve the legal impediments arising from protection of national security?

The policy analysis found that CDC/ATDSR Policy is the only policy which contains provisions relating to the legal impediments arising from the protection of national security. The related provision of the policy is produced in Table 7.3.9 below:

Table 7.3.9 Related provisions on the legal impediments arising from protection of national security

THE POLICY	RELATED PROVISION
CDC/ATDSR Policy	To ensure that issues of confidentiality, proprietary use, and informed consent are addressed correctly, the Chief Information Officers (CIOs) of the Centre/Institute/Office may choose to develop specific data release plans for each data set. Each plan should include a procedure to ensure that data are released in a form that does not endanger national security or compromise law enforcement activities. (How to Release Data - Release of data for Public Use, [VII])

CDC/ATDSR Policy recommends a procedure to ensure that data is not released in a form that endangers national security or compromises law enforcement activities and this is included in specific data release plans. Despite the above recommendation, CDC/ATDSR Policy does not provide a classification of research data of which disclosure is prejudicial to national security. Since none of the policies (including CDC/ATDSR) provides such a classification, comparative analysis on similarities/differences between the policies and the special feature/unique approach of the policies cannot be made.

7.3.10 How did the policies resolve the legal impediments arising from novelty requirement in patent law?

The policy analysis found that there are 4 policies (3 public research funding agencies and 1 university) that contain provisions relating to the legal impediments arising from novelty requirements in patent law. The related provisions of those policies are produced in Table 7.3.10 below.

Table 7.3.10 Related provisions on the legal impediments arising from novelty requirements in patent law

THE POLICIES	RELATED PROVISIONS
QUT Policy	Open access to the results of publicly funded scholarship must be balanced against the need to protect intellectual property in cases providing commercial opportunity or where considerable investment has been made by QUT or an industry partner. Consideration must be given to the prospect of commercialisation at the planning stage of a research project. Data may form part of an invention that is patentable and disclosure of the data could prevent a patent from being obtained so, while patentable research is not common, the issue should be given early consideration. If a patent is a possibility, data should only be released under confidentiality agreements until the patent has been obtained. (Access and Re-Use, [8])
MRC Policy	The MRC Policy is not intended to discourage filing of patent applications in advance of publication. It may be necessary on occasion to delay publication for a short period to allow time for applications to be drafted. (Policy Statement)
CRUK Policy	This policy is not intended to discourage filing of patent applications and recognises the need to safeguard intellectual property, to protect opportunities for commercialisation of research outputs and respect obligations of commercial confidentiality and that it may be necessary on occasion to delay publication or restrict the release of data. ([4])
	CRUK encourages the appropriate filing of patents and recognises that there may be a need to delay the release of data until patent applications have been filed. Whilst there may be a delay in the release of data due to the application process, appropriate intellectual property protection should not hinder data sharing and may be the best way of ensuring that patient (and public) benefit is delivered. (Intellectual Property Rights and Proprietary Data)
NIH Policy	NIH recognises the need to protect patentable and other proprietary data. Any restrictions on data sharing due to co-funding arrangements should be discussed in the data-sharing plan section of an application and will be considered by program staff. While NIH understands that an institution's desire to exercise its intellectual property rights may justify a need to delay disclosure of research findings, a delay of 30 to 60 days is generally viewed as a reasonable period for such activity. (Proprietary Data)

In terms of similarities, all the above policies allow disclosure of research data to be protected/delayed/restricted for the purpose of patent. In terms of differences, disclosure of research data is to be protected/delayed/restricted until patent has been obtained (QUT), drafted (MRC) or filed (CRUK). One policy (NIH) views 30 to 60 days as a reasonable period of delay in order to protect patentable data without specifying the timeframe for the patent application to be filed. However, none of the policies has fixed a timeframe for the patent application to be filed. As no timeframe to file patent has been fixed by these policies, the similarities/differences between the policies and the special feature/unique approach of the policies cannot be compared.

7.3.11 How did the policies resolve the legal impediments arising from lack of a legal duty to ensure data quality?

The policy analysis found that there are 9 policies (7 public research funding agencies and 2 universities) that contain provisions relating to the legal impediments arising from lack of a legal duty to ensure data quality. The related provisions of those policies are produced in Table 7.3.11 below.

Table 7.3.11 Related provisions on the legal impediments arising from lack of a legal duty to ensure data quality

THE POLICIES	RELATED PROVISIONS
GU Policy	The data management plan must identify the measures to be put in place for quality assurance and controls including provisions for the auditing of compliance with data management and access requirements. (Quality Assurances and Control, [3.7])
MRC Policy	Research data arising from MRC funded research must be properly curated throughout its life-cycle and released with the appropriate high-quality metadata. The policy imposed the responsibility on data custodians, who are usually those individuals or institutes that received MRC funding to create or collect data. (Policy Statement)
BBSRC Policy	BBSRC recognises the importance of data quality and provenance. Where appropriate, should be accompanied by contextual information or documentation (metadata) to provide secondary user with any necessary details on the origin or manipulation of the data in order to prevent any misuse, misinterpretation or confusion. (BBSRC Data Sharing Policy Statement)
	In order to maximise the potential re-use of data, BBSRC researchers should generate and manage data using widely accepted formats and methodologies where available. Data released for sharing should be validated and verified in-line with accepted best practice and be of high quality. Data should be accompanied by the contextual information or documentation (metadata) needed to provide a secondary user with any necessary details on the origin or manipulation of the data in order to prevent any misuse, misinterpretation or confusion. Where standards for metadata exist, the policy expects that these standard should be adhered to. (Standards and Metadata, Policy Implementation 1: Integrating Data Sharing into Existing Support and Monitoring Processes)
NERC Policy	Good data management techniques are a fundamental component of good scientific practice. Data management planning provides a mechanism to define key data management activities which are necessary to ensure the integrity and security of the data sets generated by the research process. (NERC Data Policy, Guidance Notes - Generating New NERC-Funded Data – Information for Data Creators, [4])
	The NERC data centres require detailed information about how the data were arrived at, i.e. metadata, covering methods of collection, processing, calibration and quality control must be supplied, so that all the necessary information is available to allow others to effectively re-use the data. "Metadata" encompasses all the information necessary to interpret, understand and use a given data set. (Metadata, NERC Data Policy,

	Guidance Notes – Metadata, [4(e)])
	The network of NRC data centres are responsible for the long term curation of data and provide access to NERC's data holdings. Specific activities of the NERC Environmental Data Centres include ensuring that high quality metadata are stored with the data so that users have all the information they need to use the data in the future without normally having to refer back to the data creator. (NERC Data Policy, Guidance Notes – NERC Data Centres, [5])
ESRC Policy	Commitment to long-term preservation, high quality data management and strengthening provision for secondary data analysis forms the centrepiece of the research data policy. (Introduction, [1])
	ESRC recognises the importance of research data quality and provenance. Research data generated by ESRC funded research must be well managed by the award holders during the award period to enable their data to be exploited to the maximum potential for further research. To this effect, research data must be accompanied by high-quality metadata in order to provide secondary users with the important additional information, for example, the origin, circumstances, processing/analysis and/or the researcher's management of the data. (ESRC's Policy Statement, [1.2(7)])
CRUK	Data arising from Cancer Research UK funded research should be properly curated throughout its life-cycle and released with the appropriate high-quality data. This is the responsibility of the data custodians, who are usually those individuals or institutes that received Cancer Research UK funding to create or collect the data. ([7])
	For data sharing to be a success it is important that data are prepared in such a way that those using the dataset have a clear understanding of what the data mean so that they can be used appropriately. To enable this, applicants are encouraged to include with the dataset all the necessary information (metadata) describing the data and their format. This information should include such information as the methodology used to collect data, definitions of variables, units of measurement, any assumptions made, the format of the data, file type of the data, etc. To support this the applicants are strongly encouraged to utilise community standards to describe and structure data. (Standards, Metadata and Documentation)
EAR Policy	Data archives must include easily accessible information about the data holdings, including quality assessments, supporting ancillary information, and guidance and aids for locating and obtaining data. (Dissemination and Sharing of Research Results, [2])
CDC/ATDSR Policy	All released data must be as complete and accurate as possible (How to Release Data, [7])
	Before any data are released/shared, all phases of data collection, transmission, editing, processing, analysis, storage, and dissemination must be evaluated for quality. Preliminary data from a research project may be shared with outside partners for quality assessment but not for publication. Personnel who share data for quality assessment must follow procedures that are consistent with confidentiality agreements and other constraints. (Guidance for CIOs, Guiding Principals- Scientific Practice, [VI])
	Evaluation of data quality must include tests for completeness, validity, reliability, and reproducibility. (Implementation of CDC's Data Release/Sharing Policy – An Evaluation of Data Quality, [VIII])

	All released data must have documentation that shows the conditions under which the data were collected, what the data represent, the extent of the data's completeness and accuracy, and any potential limitations on their use. Careful documentation increases the likelihood that secondary data users will interpret data correctly. (Implementation of CDC's Data Release/Sharing Policy – Documentation, [VIII])
	CDC will develop standards for the elements needed to document data. These standards could be developed on the basis of a review of best practices for data archiving. Specifically, CDC standards for documentation should be compatible with those of private industry. (Implementation of CDC's Data Release/Sharing Policy – Documentation, [VIII])
	Information that will preclude misinterpretation of data should accompany all released data. (Implementation of CDC's Data Release/Sharing Policy - Public Release Disclosure Statement, [VIII])
UT Policy	The University is ultimately responsible for the accuracy and sufficiency of research records. The University is responsible for research data developed by University personnel in performing their employment duties or research data developed through substantial use of facilities or funds provided by the University. Such responsibility applies to research funded by external sources and managed by the University, unless the University agrees to another arrangement in a grant, contract, or other agreement. (Responsibility for Research Data, [3])
	The University's responsibility for the accuracy and sufficiency of scientific record for projects conducted at the University, under University auspices, or with University resources is based upon: i. section 53, United States Office of Management and Budget Circular A-110; ii. the University's need to assess and defend charges of intellectual dishonesty; iii. the University's need to support and commercialize the management of intellectual property; and iv. the University's mission to develop and disseminate new knowledge. (Responsibility for Research Data, [3])

In terms of similarities, all the above policies policy have developed a standard of care for open access data providers to ensure data quality. Four policies (BBSRC, NERC, ESRC, CRUK) require data quality to be ensured by providing sufficient contextual information and documentation in the form of a data management plan and/or high-quality metadata describing the data and its format. One policy (NERC) requires the data centre to require detailed information about how the data was arrived at, i.e. metadata, covering methods of collection, processing, calibration and quality control to be supplied, so that all the necessary information is available to allow others to effectively re-use the research data. Another policy (CDC/ATDSR)

requires all released data to have documentation to show the conditions under which the data was collected, what the data represents, the extent of the data's completeness and accuracy, and any potential limitations of its use. Information that will preclude misrepresentation of data should accompany all released data. Besides metadata, two policies (GU/NERC) require a data management plan to be created before the research has begun that identifies measures to be put in place for quality assurance and controls.

In terms of differences, the responsibility to ensure data quality falls on several parties including data custodians who are usually those individuals or institutes that received funding to create or collect data (MRC, CRUK), the researchers who generate and manage data (BBSRC), researchers/scientists who conduct the research (CDC/ATDSR), the data centres/data service providers (NERC) and the University where the research data is developed (UT). In terms of special feature/unique approach, two policies (BBSRC/CDC/ATDSR) require data released for sharing to be evaluated, validated and verified in-line with accepted best practice prior to data sharing/release.

7.4 SUMMARY

Overall this chapter analyses 23 policies of public research funding agencies and universities from Australia, the UK and the US, which support open access to and re-use of publicly funded research data. Analysis found that only 17 policies contain provisions relating to the legal impediments. These 17 policies have been compared in order to determine how the policies resolved the legal impediments. It is found that four legal impediments (i.e. ambiguity about ownership of research data, author's moral right of integrity, protection of national security and novelty requirements in patent law) have not been resolved by the policies compared above. For the remaining legal impediments that have been resolved by one or more of the policies, the comparative analysis draws a better picture of the methods or techniques adopted by these policies to resolve the legal impediments.

Admittedly, analysing and comparing the policies of other countries *per se*, does not mean that right or better solutions have been found to resolve the legal

impediments that exist under the Malaysian laws. While a particular solution may work very well in one country, there is no guarantee that it will also work if applied in Malaysia. This is due to the fact that the laws underpinning the legal impediments could be different in Malaysia from these countries. While lessons could be learned from the policies of the research funders and universities in Australia, the UK and the US, the policies should not be adopted *en blocke*, as a ready-made template to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

The findings of this chapter strongly suggest that a comprehensive policy needs to be developed to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. Hence, the next chapter develops a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. It answers the final research question: How should a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities be developed?.

CHAPTER 8
DEVELOPING A POLICY

8.1 OVERVIEW

The aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. In developing the policy, this chapter answers the final research question: How should a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities be developed? The findings from the previous chapters are used as inputs to develop the policy.

In the previous chapters, it is found that that:

i. the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities is justified under economic, innovation, public good, human rights and social justice theories, which underline the benefits of open access to and re-use of research data to the society at large;
ii. there are at least seven internal benefits to be enjoyed by universities and university researchers as data providers and data users that make it desirable for the Malaysian public universities to enable open access to and re-use of publicly funded research data created/originated by their researchers;
iii. there are 11 legal impediments to the objective of enabling open access to and re-use of publicly funded research data arising from intellectual property(copyright and database rights), confidentiality, privacy, national security, patent and tort laws;
iv. all the legal impediments to open access to and re-use of publicly funded research data that are identified in this thesis are found to exist under the Malaysian laws.
v. the majority (9 out of 11) of the legal impediments that exist under the Malaysian laws have not been resolved by the existing policies of Malaysian public universities; and

vi. the policies of public research funding agencies and universities from Australia, the UK and the US that support open access to and re-use of publicly funded research data also did not fully resolve the legal impediments.

The above findings lead to the conclusion that it is necessary for this thesis to develop a comprehensive policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

In developing the policy, this thesis acknowledges the earlier works of a group of researchers from Open Access to Knowledge (OAK) Law Project headed by Prof Brian Fitzgerald and Prof Anne Fitzgerald of the Law Faculty, Queensland University of Technology. Among the OAK Law Project's dedicated team members (past and present) are Neale Hooper, Jessica Coates, Kylie Pappalardo and Cheryl Foong (just to name a few). The OAK Law Project has published several reports and guidelines on open access that identify various legal issues surrounding open access.[1249]

When compared to the aim of this thesis, it is found that the OAK Law Project's reports and guidelines did not develop a policy enabling open access to and re-use of publicly funded research data. The reports and guidelines only provide guidance to manage the legal rights in research data with respect to ownership, data sharing, access and re-use, patents, confidentiality, contract and privacy law.[1250] Some of the OAK Law Project's guidelines focus on open access publications and the legal issues surrounding open access publication rather than on open access to and re-use of publicly funded research data.[1251]

1249 Among the reports and guidelines prepared by the OAK Law Projects that have been published are: Brian Fitzgerald et al, 'OAK Law Project Report No. 1: Creating a Legal Framework for Copyright Management of Open Access Within the Australian Academic and Research Sector' (Queensland University of Technology, 2006); Kylie Pappalardo et al, 'A Guide to Developing Open Access Through Your Digital Repository' (2007) 13, http://www.oaklaw.qut.edu.au/node/32; Fitzgerald and Pappalardo, above n 228; Fitzgerald, Papalardo and Austin, above n 135; Anne Fitzgerald, Kylie Pappalardo and Anthony Austin, 'Practical Data Management: A Legal and Policy Guide' (Queensland University of Technology, 2008).

1250 See Fitzgerald, Pappalardo and Austin, above n 1249; Fitzgerald and Pappalardo, above n 228.

1251 See Pappalardo et al, above n 1249, 13, <http://www.oaklaw.qut.edu.au/node/32>; Pappalardo et al, above n 363, 2, 93.

In developing a policy to support the objective of enabling open access to and re-use of publicly funded research data, it is important to observe Stevan Harnad's argument not to conflate open access to research publication with open access to research data. Kuula and Borg also argue that the open access objectives which concentrate on digital publications, cannot be wholly adapted to digital data and in some cases the openness of research data is much more restricted.[1252]

Although the OAK Law Project did not develop a policy to support open access to and re-use of publicly funded research data, its reports and guidelines provide a significant input to the aim and objective of this thesis. The policy that is developed by this thesis could be seen as an extension from the previous works of the researchers at the OAK Law Project. This thesis also makes its own original contribution as it develops a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

8.2 DEVELOPING A POLICY

8.2.1 What is a Policy?

A policy is defined in the New Oxford Dictionary of English as a course or principle of action adopted or proposed by a government, party, business or individual.[1253] A policy is also defined as a principle or rule to guide decisions and achieve rational outcomes.[1254] Another definition of policy is as a definite course or method of action selected from various alternatives and in light of given conditions to guide and determine present and future decisions.[1255] The above definitions are by no means exhaustive but are sufficient to describe what is a policy for the purpose of this thesis. A policy applies below the level of legislation and is different from rules or

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1252 See Stevan Harnad, 'On Not Conflating Open Data (OD) With Open Access (OA)' (2010), <http://openaccess.eprints.org/index.php?/archives/733-On-Not-Conflating-Open-Data-OD-With-Open-Access-OA.html> (at 15 February, 2011); Kuula and Borg, above n 628, 27.

1253 Office of the First and Deputy First Minister of Northern Ireland, 'A Practical Guide to Policy Making in Northern Ireland' (Economic Policy Unit Office of the First and Deputy First Minister of Northern Ireland).

1254 Wikipedia, 'Policy', <http://en.wikipedia.org/wiki/Policy> (at 18 November 2011).

1255 Azman Mohd Yusof, 'Policy Formulation Process - Based on the Malaysian Experience' (2001), <http://azman97.tripod.com/policy.html> (at 16 November 2011).

law. While rules or law can compel or prohibit behaviours, policy merely guides actions toward those that are most likely to achieve desired outcomes.[1256]

Some academicians and political scientists classify policy into two broad categories: action policy and inaction (aspiration) policy. In contrast to action policy, inaction/aspiration policy refers to a mere policy statement that may not result in any concrete action being taken.[1257] Further, policy can be classified as distributive, regulatory or constituent policies. While distributive policies extend goods, services, or the costs of the goods/services to/amongst members of an organisation, the regulatory policies mandate or compel certain types of behaviour. The constituent policies on the other hand, create executive power entities or deal with laws.[1258] To enable open access to and re-use of publicly funded research data, the policy developed by this thesis should be an action policy rather than inaction policy. The policy should also serve as a regulatory policy by making certain acts compulsory or prohibited.

A policy can also be classified as mandatory policy or voluntary policy. Being a regulatory policy, the policy developed by this thesis should function as a mandatory policy as it is found that universities that establish online electronic repositories are wasting their money and effort if they maintain a voluntary open access policy. It is reported that the percentage of compliance with voluntary open access policies is poor, running at most at 12% to 20%.[1259] A report by the Natural Sciences and Engineering Research Council of Canada also indicates that global trend in open access is moving from voluntary to mandatory open access policies.[1260]

1256 See 'Policy Framework' (2011) *University of Sydney*, <http://sydney.edu.au/legal/policy/university/framework.shtml> (at 27 January 2012); Wikipedia, above n 1254.

1257 Mohd Yusof, above n 1255.

1258 See Office of the First and Deputy First Minister of Northern Ireland, above n 1253; Wikipedia, above n 1254.

1259 Arthur Sale, 'The Impact of Mandatory Policies on ETD Acquisition' (2006) 12(4) *D-Lib Magazine*, <http://www.dlib.org/dlib/april06/sale/04sale.html> (at 18 August).

1260 Anonymous, 'NSERC Policy Development: Access to Research Outputs' (Natural Sciences and Engineering Research Council of Canada, 2008).

8.2.2 Characteristics of a Good Policy

A good policy possesses several important characteristics. A good policy helps to accomplish organisational objectives. Further, a good policy complies with all applicable laws, is enforceable and is historically informed.[1261] In order to be a good policy, it should be in writing and compiled in a manual form.[1262] The policy document must be written using simple, clear, concise language. It must also differentiate between "policy", "procedure" and other appropriate headings within the section.[1263]

8.2.3 The Basic Components of the Policy

The basic components of a policy include i) title of the policy, ii) background – indicating reasons, history and intent that led to the creation of the policy, which may be listed as motivating factors; iii) purpose – a concise summary of objectives of the policy and outlines of what the desired effect or outcome of the policy should be; iv) applicability and scope – describing who the policy affects and which actions are impacted by the policy. The applicability and scope may expressly exclude certain people, organisations or actions from the policy requirements; v) effective date – which indicates when the policy comes into force; vi) definitions – providing clear and unambiguous definitions for subject matter which require a precise understanding of terms and concepts; vii) policy statements - a brief statement containing the governing principles, plan or understanding that guides the action; viii) further information – provide an office name, telephone number, email address or web address for individuals who may need assistance or additional information to

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1261 Michael D Leonard, 'Effective Policy - 17 Characteristics of Good Policy', <http://ezinearticles.com/?Effective-Policy---17-Characteristics-of-Good-Policy&id=5562525> (at 18 November 2011).

1262 Rai University, 'Principles of Management: Lesson 14 - Policy, Plan, Programs, Budget and the Difference Between Them' 30, <http://rocw.raifoundation.org/computing/BCA/principleofmanagements/lecture-notes/lecture-14.pdf> (at 18 November 2011).

1263 University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy.

contact; and ix) references – list of sources upon which the policy section is based, including laws and other policies. [1264]

Besides the basic components stated above, an action/regulatory/mandatory policy also contains i) procedures – which describe how the policy is implemented by describing the process and responsibilities for accomplishing tasks governed by the policy; and ii) guidelines – which provide suggested methods for accomplishing tasks governed by the policy, but are not mandatory.[1265]

8.2.4 Key Stakeholders of the Policy

According to Paul Uhlir, the development of data access policies could be either from top down or bottom up. The key stakeholders in top down policy development are:

i. Government(s);
ii. Research funding agencies; and
iii. International and inter-governmental organisations. [1266]

The key stakeholders in bottom up data access policy development are:

i. Universities and not-for-profit research institutes;
ii. Industry research institutions;
iii. Informatics organisations/institutions (libraries, data centres, archives);
iv. Learned societies (umbrella research community organisation);
v. Individual researchers; and
vi. General public and NGOs .[1267]

1264 See University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy; Geraldine S Perry, 'Writing a Good Policy', <www.apha.org/.../0/HowtowriteagoodpolicyAPHA2008.ppt> (at 18 November 2011).

1265 See University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy; Perry, above n 1264.

1266 Paul F Uhlir, 'Policy for Publicly Funded Scientific Data in the US' (Paper presented at the Public Symposium of the Value of Shared Access and Re-Use of Publicly Funded Scientific Data, National Academy of Sciences, Washington DC, 1 December 2010).

1267 Ibid.

Based on the above inputs, the main recommendations on matters that require prior attention and consideration in the development of the policy are hereby provided below. The main recommendations cover the type, the basic components, the criteria and the key stakeholders of the policy to be developed in this thesis. For the purpose of clarity and convenience the main recommendations are presented in a table.

Table 8.2.1 Main Recommendations: The Policy

THE POLICY
1. The policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities should be developed as an action and regulatory policy instead of an inaction/aspiration policy.
2. The policy should adopt mandatory policy to ensure full compliance with the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.
3. The policy should be developed in accordance to the international standard and serves as a common policy for all public universities in Malaysia.
4. The policy should reflect the characteristics of a good policy whereby clarity, simplicity, fairness and full compliance with the law are the main criteria which the policy should reflect.
5. The policy should be divided into three parts. The first part is the basic components of the policy. The second part is the procedures of the policy which govern the implementation of the policy. The third part is the guidelines on the best practices to resolve the legal impediments to the objective of the policy, which exist under the Malaysian laws.
6. The policy should be developed using a bottom up policy development approach, since a top down policy to support the objective of enabling open access to and re-use of publicly funded research data is yet to be developed by the Federal Government and the public research funding agencies in Malaysia.
7. The Malaysian public universities should act as a key stakeholder in the development of the policy.

The main recommendations above create a starting point for the development of a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian the public universities. As recommended above,

this thesis develops the policy in three parts. The first part has 11 sections dealing with the basic components of the policy. The second part has four sections dealing with the procedures of the policy. The third part has 11 sections dealing with the guidelines of the policy. Each part contains recommendations on the basic components, procedures and guidelines of the policy presented in tables.

PART I BASIC COMPONENTS OF THE POLICY

8.3 THE BASIC COMPONENTS

The basic components of the policy contain the title, policy background, purpose of the policy, applicability and scope, effective date, definitions, policy statements, governing principles, action plan, further information and references. Policy recommendations are made on the basic components of the policy. In providing the recommendations, due consideration is given to the policies that support open access to and re-use of publicly funded research data, which were analysed in Chapter 7. The basic components of these policies are used as benchmarks for the policy. Where suitable, and after necessary modifications, the basic components of the policies analysed in Chapter 7 are adopted as part of the recommendations to develop the policy.

8.3.1 Title

Among the most common titles given to the policies analysed in Chapter 7 are Data Management Policy,[1268] Data Policy, [1269] Data Sharing Policy, [1270] and Data Access Policy. [1271] None of the above titles sufficiently describe the policy to be developed

[1268] See QUT Policy for the Management of Research Data 2010; GU Guidelines for Research Data Management; UNA Research Data and Materials Management Policy 2008; MU Research Data and Management Policy 2010; UE Policy for Management of Research Data 2011; UNH Ownership and Management of Research Data Policy.

[1269] See RCUK Common Principles on Data Policy, NERC Data Policy 2011; Economic and Social Research Council Data Policy 2010; UW Research Data Policy 2008; UT Research Data Policy.

[1270] See MRC Data Access Principles and Data Sharing and Preservation Policy; BBSRC Data Sharing Policy Version 1.1 June 2010; CRUK Policy on Data Sharing and Preservation 2009; NIH Data Sharing Policy and Implementation Guidance 2003; NSF Data Sharing Policy 2011; CDC/ATSDR) Policy On Releasing And Sharing Data 2005.

[1271] See CU Research Data: Recording, Retention and Access Policy 2007; VCU Research Data Ownership, Retention and Access Policy 2009.

by this thesis. The title given to the policy should reflect the aim of this thesis to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

Table 8.3.1 Policy Recommendation 1

TITLE OF THE POLICY
The title given to the policy is: "Policy Enabling Open Access to and Re-Use of Publicly Funded Research Data in Malaysian Public Universities"

8.3.2 Policy Background

The policy background of the policies analysed in Chapter 7 are motivated by one or more benefits underlined by economic, innovation and public good theories.[1272] However, none of the policies analysed in Chapter 7 have a policy background that captures the entire benefits under all five theories examined under Chapter 2 i.e. economic, innovation, public good, social justice and human rights theories. In developing the policy, its policy background should capture broader theoretical perspectives comprising all the benefits underlined by those theories.

Table 8.3.2 Policy Recommendation 2

POLICY BACKGROUND
1. The development of this policy is motivated by economic, innovation, public good, social justice and human rights theories which underline the benefits of open access to and re-use of research data. 2. Based on these theories and various arguments and evidence presented in support of these theories, it is anticipated that enabling open access to and re-use of publicly funded research data can:

[1272] See Dissemination of Research Outputs, ARC Discovery Projects Funding Rules for Funding Commencing in 2011, [A1.3.1]; NHMRC Dissemination of Research Findings Policy; QUT Management of Research Data Policy 2010, Policy Principles, [2.8.1]; MU Research Data Management Policy 2010, Policy Statement; Principles for Access to and Use of MRC Funded Research Data, Data Access Principles; BBSRC Data Sharing Policy 2010, Introduction: Background and Context, [1]; ESRC Research Data Policy 2010, Introduction, [1]; NERC Data Policy 2011, NERC Data Policy Statement; CDC/ATSDR Policy on Releasing and Sharing Data 2005, Background, [1]; CU Research Data: Recording, Retention and Access Policy 2007, Reasons for Policy; UNH Ownership and Management of Research Data Policy 2007, Introduction, [1]; UW Research Data Policy 2008, Background: Purpose, Definitions, and Context, [1]; UT Research Data Policy, Control of Research Data, [4].

i. increase economic returns from public investment in research;

ii. stimulate open innovation and grass-roots innovation;

iii. allow utilisation of research data as a global public good;

iv. reduce information gap and information poverty by providing equal distribution and equal opportunity to the advantaged and least advantaged groups; and

v. empower the right to know and democratic participation of citizens by giving the right to receive and impart research data and information.

3. All these benefits to the society provide a strong justification to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

8.3.3 Purpose of the Policy

The policies are derived from various purposes (also known as objective/aim/goal) and the policies are designed to operationalise these purposes/objectives/aims/goals of the policies.[1273] The purpose/objective/aim/goal of the policy is concrete statements about its desired end states, with a set of criteria used to analyse and compare different proposed policy alternative or solutions to meet the purpose/objective/aim/goal of the policy.[1274] The purpose/objective/aim/goal of the policies analysed in Chapter 7 state various benefits of open access to and re-use of research data as the policies' desired end.[1275] Since the Malaysian public universities are the key stakeholders of the policy, the purpose of the policy should state as its desired end the benefits of open access to and re-use of research data examined in Chapter 3, which provide solutions to the problems/challenges faces by the universities.

[1273] Rai University, above n 1262.

[1274] California State University Long Beach, 'PPA 670 Policy Analysis: Establishing Analysis Criteria', <http://www.csulb.edu/~msaintg/ppa670/670steps.htm> (at 18 November 2011).

[1275] See MU Research Data Management Policy 2010 – Purpose; Aims of the MRC Data Sharing Initiative – Benefits; EPSRC Policy on Research Data 2011; NERC Data Policy 2011 - NERC Data Policy Statement; NIH Data Sharing Policy and Implementation Guidance 2003, Purpose, [II] - [V]; CDC/ATSDR Policy on Releasing and Sharing Data 2005 - Benefits of Releasing or Sharing CDC Data; UT Research Data Policy, Objectives, [1].

Table 8.3.3 Policy Recommendation 3

PURPOSE OF THE POLICY
1. The reports and studies which have been conducted at national and international levels found the following problems and challenges commonly faced by universities and university researchers all around the world: i. University researchers are facing accessibility problems as university libraries are hard hit by the serial crisis and are unable to subscribe to all research journals containing a wealth of research data and information; ii. Universities, in playing their dual roles as academic and research institutions, have found that print publications and conventional libraries fail to increase the visibility and impact of research data from research activities undertaken by university researchers; iii. At the same time, universities are plagued with incidents of scientific fraud, partly due to the unavailability of research data for further verification and replication; iv. The unavailability of research data for others to access and re-use has also resulted in a waste of efficiency and university resources, as similar research data has to be collected by other researchers undertaking new research; v. The proliferation of international research collaborations such as e-Science and e-Research, which are data intensive, have increased the need for universities to release and share their research data online in order to participate in the research collaborations; vi. Various incentives given to the researchers to patent and commercialise publicly funded research outputs have resulted in restrictive/delayed publication of research data, which undermines the academic mission of universities. The incentives to patent and commercialise academic publicly funded research outputs gradually erode the culture of gifts and the academic commons in public universities vii. While the norms of open science are best served by free and wide dissemination of research data, data withholding practices/refusal to share/release research data/data secrecy are now common among university researchers resulting in widespread data and information lock-up.
2. With all the problems and challenges faced by universities and university researchers all around the world, the purpose of the policy is to provide solutions that can help the

Malaysian public universities:

i. overcoming the accessibility problem faced by university researchers;

ii. increasing the visibility, citation and impact of university research;

iii. detecting scientific fraud by university researchers;

iv. avoiding unnecessary duplication and repetition of research efforts;

v. participating in international e-Science and e-Research collaborations;

vi. preserving the academic mission of public universities; and

vii. promoting the norms of open science among university researchers.

3. The solution provided by the policy is by enabling open access to and re-use of publicly funded research data in Malaysian public universities.

4. Enabling open access to and re-use of publicly funded research data has been recommended by international experts, scholars, governmental and non-governmental bodies as an effective method to solve the above problems and challenges.

8.3.4 Applicability and Scope

The policies analysed in chapter 7 clarify the applicability and scope of their policies by describing who the policy affects, the type of research data and research funding covered by the policy.[1276] The policies are applicable to fully, partially and substantially funded research data created by the staff (both academic and non-academic staff), non-staff (adjuncts, visitors, and any other persons at the University) and students (undergraduate, postgraduate, undergraduate students).[1277] The policies also cover a broad spectrum of preliminary and final research data ranging from basic research, clinical studies, surveys and other types of research, involving both

[1276] See QUT Management of Research Data Policy 2010, Application, [2.8.2]; MU Research Data Management Policy 2010 – Scope; EPSRC Policy on Research Data 2011 – Scope; NERC Data Policy 2011, Data Covered by the NERC Data Policy, [1]; BBSRC Data Sharing Policy 2010 - Data Sharing Areas; CRUK Data Sharing Guidelines 2009- Applicability; NIH Data Sharing Policy and Implementation Guidance 2003 – Applicability; CDC/ATSDR Policy on Releasing and Sharing Data 2005, Data Covered by this Policy, [III]; UW Research Data Policy 2008, Applicability and Administration, [II.1]; UW Research Data Policy 2008, Sponsored Research Agreements, [II.3]; UT Research Data Policy, Control of Research Data, [4].

[1277] See NERC Data Policy 2011 - NERC Data Policy Statement; QUT Management of Research Data Policy 2010, Application, [2.8.2]; MU Research Data Management Policy 2010 - Scope.

human and non-human subjects.[1278] In terms of the limitation, one policy only applies to research data produced by applicants seeking USD500,000 or more in direct costs in any year of the proposed project period.[1279]

In determining the applicability and scope of the policy, the term "Research", "Research Data" and "University Researcher" defined in the policy will be used as a term of reference.[1280] As the aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities, the policy should apply to publicly funded research data created by university researchers (employees, non-employees and students alike) in all research fields and disciplines regardless of the stage (preliminary/final), the type of the research data or whether the research data is pre-published, published or unpublished. Since the research data is to be released online, the applicability and scope of the policy should be limited to research data which is computer-readable and which exist in digital format or have been digitised from various non-digital media.[1281]

In terms of funding, the policy should be applied regardless of the amount of funding but should be limited to research data which is fully funded using public funds. The exclusion of partially publicly funded research from the policy is consistent with recent findings from an online survey conducted by the EU. The survey found that a lower number of respondents support the free availability for re-use of data resulting from partly publicly funded research.[1282]

Table 8.3.4 Policy Recommendation 4

APPLICABILITY AND SCOPE
1. The policy is applicable to pre-published, published or unpublished research data of all types and stages (preliminary or final) which is created/originated by university

[1278] See NERC Data Policy 2011 - NERC Data Policy Statement; NIH Data Sharing Policy and Implementation Guidance 2003 – Applicability; CRUK Data Sharing Guidelines 2009 - Applicability.

[1279] See NIH Data Sharing Policy and Implementation Guidance 2003 - Applicability.

[1280] See Table 8.3.6 – Policy Recommendation 6

[1281] See OECD Principles and Guidelines for Access to Research Data from Public Funding 2007; Suber, above n 1, 97.

[1282] Directorate-General for Research and Innovation, 'Online Survey on Scientific Information in the Digital Age: Studies and Reports' (European Commission, 2012).

researchers from research activities fully funded by the Federal Government of Malaysia either through the university's internal research grants or the university's external research grant disbursed by the government's ministries or agencies through the universities.

2. The research which is covered by the policy comprises all scientific and non-scientific research activities undertaken by university researchers including pure/basic/fundamental research and applied/experimental/strategic research, across all academic disciplines in the university (including but not limited to natural and applied sciences, social sciences and humanities)
3. The university researcher covered by the policy is an individual who is engaged in research activity covered by the policy who is either an employee of the university (academic, non-academic, permanent, temporary, full-time, part-time or casual employee), a non-employee of the university (such as visitor, associate or adjunct attached to the university under contracts or agreements) or a registered student of the university.
4. Malaysian public universities under the policy refers to higher education institutions listed by the Malaysian Higher Education Department in its current and future lists as public universities in Malaysia.
5. The policy only applies to the research data that exists in digital and computer-readable format, comprising both research data which is born digital or digitised from print, microfiche, film and other non-digital media.

8.3.5 Effective Date

The policies analysed in Chapter 7 provide the effective date of enforcement of the policies approved by their governing Board/Council.[1283] Several policies provide the effective date without mentioning whether the policies have been approved/endorsed by their respective governing bodies.[1284] Since the key stakeholders of the policy are the Malaysian public universities, the effective date should only take force on/after the policy has been approved/endorsed by the Board/Senate Committee of the university.

[1283] See EPSRC Policy on Research Data 2011; NERC Data Policy 2011; VCU Research Data Ownership, Retention and Access Policy 2009.

[1284] See CRUK Data Sharing Guidelines 2009 – Applicability; UE Policy for Management of Research Data 2011, [7]; NIH Data Sharing Policy and Implementation Guidance 2003 - Applicability.

Table 8.3.5 Policy Recommendation 5

EFFECTIVE DATE
The policy has been approved by the Board/Senate Committee of the university on ..... (later to be dated) and is effective with immediate effect.

8.3.6 Definitions

The definition of "Research Data" and other terms that are relevant to the policy, such as "Open Access", "Research" and "Publicly Funded Research" are provided in Chapter 1 of this thesis.[1285] The policies analysed in Chapter 7 also provide definitions of "Research Data" and other similar terms.[1286] However, definition of the terms peculiar to the policy such as "Publicly Funded Research Data in Malaysian Public Universities", and "Enabling Open Access to and Re-Use of Publicly Funded Research Data in Malaysian Public Universities" can only be found in Chapter 1 of this thesis. To define the relevant terms and key concepts of the policy, reference should be made to the policies as well to this thesis.

Table 8.3.6 Policy Recommendation 6

DEFINITIONS
In this policy, the following terms and key concepts are defined as follows: **"Open Access"** is open international access to the research data that removes all permission barriers and unnecessary copyright and licensing restrictions. There are three aspects of openness in open access: i) technology openness (data is available on the web in machine readable and open standard format); ii) non-proprietary openness (data is seen as a common resource which should not be restricted to just a certain group of people; and iii) legal openness (data must be licensed under such a licence that recognises the user's right to use/re-use data in a variety of way, including commercially). **"Research Data"** is recorded factual material derived from scientific or non-scientific

1285 See 1.3 Terminology.

1286 See QUT Management of Research Data Policy 2010, Definitions: Research Data, [2.8.3]; GU Guidelines for Research Data Management (V.4) 2009, Definitions; Data, [2.4.1] – [2.4.4]; UNA Research Data and Materials Management Policy 2008, Clause 3- Definitions, Research Data; EPSRC Policy on Research Data 2011 – Scope; ESRC Research Data Policy 2010, Introduction, [1]; NERC Data Policy 2011 - NERC Data Policy Statement; UW Research Data Policy 2008, Background: Purpose, Definitions, and Context, [I.2]; VCU Research Data Ownership, Retention and Access Policy 2009 – Definition: Research Data; UNH Ownership and Management of Research Data Policy 2007, Research Data, [2.3]; UT Research Data Policy, Definition of Research Data, [2].

research activities (referred as scientific research data or non-scientific research data respectively) which exists in the form of textual records (such as survey data, questionnaires, interview guides, a spreadsheet of ocean temperatures) numerical scores (such as equations, statistics, a list of numbers or dates), compilation (such as database, data sets), images (whether fixed images such as photos, diagrams, maps, tables, drawings, charts, plans, slides or moving images such as videos, movies, animations, simulations), sounds (which include audio recording), and algorithms. All data which exist in the form of text, numbers, images or sounds can be raw data, cleaned/processed data or published data. Research data serves either as research input (information used to generate research conclusions and are commonly accepted as necessary to reconstruct research/preliminary research data) or research output (first order results of that research/final research data which document, support and validate scientific or non-scientific research findings), regardless of the source or method of collection, as long the research data is collected and prepared with a suitable research methodology.

"Research" is systematic scientific and non-scientific activities across disciplines that includes but is not limited to in the natural and applied sciences, social sciences and the humanities to create, advance and increase the stock of knowledge and the use of this stock of knowledge for commercial, industry, public or academic needs. Research can be classified into pure/basic/fundamental research and applied/experimental/strategic research.

"Publicly Funded Research" is research conducted using public funds provided by the Federal Government of Malaysia.

"Publicly Funded Research Data in Malaysian Public Universities" refers to research data created by an individual researcher or a group of researchers comprising at least one researcher who is attached to a Malaysian public university, either as an employee of the university (academic, non-academic, permanent, temporary, full-time, part-time or casual employee), a non-employee of the university (such as visitor, associate or adjunct attached to the university under contracts or agreements) or a registered student of the university from research activities which are fully funded by the federal government of Malaysia (collectively referred as the "**University Researchers**"). Such funding may be provided to the university researchers either through the university's internal research grants or the university's external research grants disbursed by the government's ministries or agencies through the universities.

"Enabling Open Access to and Re-Use of Publicly Funded Research Data" means releasing publicly funded research data in digital format through self-archiving in online

open access repositories, which are interoperable. It requires a license to be granted allowing research data to be freely used, re-used and distributed by anyone down the chain of users.

8.3.7 Policy Statements

The policies analysed in Chapter 7 contain policy statements that emphasise the need to comply/to be consistent with existing legislations, codes, ethics, policies, guidelines, regulations and contractual requirements/agreements governing access to and disclosure of research data. [1287] In particular, the policy statements contain a requirement for data access and re-use to be considered in the context of intellectual property/proprietary data/ exclusive rights on data, data protection, privacy, confidentiality, national security and commercial interests which preclude/exempt/constraint/restrict data sharing. [1288] The policy statements of several policies require/expect data sharing to be cost effective and the shared data to be of the highest quality standards.[1289] Despite the above requirements, several policies in their policy statements expect research data to be released with as few restrictions as possible/to be put to maximum use.[1290] In line with the policies analysed in Chapter 7, the policy statements of the policy should place emphasis on general compliance with existing laws, codes, ethical, policies, guidelines, regulations and contracts. It should also place emphasis on the need to consider the restrictions under intellectual property, privacy, confidentiality, national security and commercial interests. In

1287 Those policies are MU Research Data Management Policy 2010; Biotechnology and BBSRC Data Sharing Policy 2010; Policy Statement, MRC Policy on Data Sharing and Preservation; NERC Data Policy 2011; CRUK Data Sharing Guidelines 2009; ESRC Research Data Policy 2010; UE Policy for Management of Research Data 2011 – Policy; CU Research Data: Recording, Retention and Access Policy 2007; VCU Research Data Ownership, Retention and Access Policy 2009.

1288 See MU Research Data Management Policy 2010 - Policy Statement; BBSRC Data Sharing Policy 2010 - Policy Statement; MRC Policy on Data Sharing and Preservation - Policy Statement; NERC Data Policy 2011 - NERC Data Policy Statement; CRUK Data Sharing Guidelines 2009 – Cancer Research UK's Stance on Data Sharing; ESRC Research Data Policy 2010 - ESRC's Policy Statement; UE Policy for Management of Research Data 2011 – Policy; CU Research Data: Recording, Retention and Access Policy 2007 - Policy Statement; VCU Research Data Ownership, Retention and Access Policy 2009 - Policy: Access to Research Data.

1289 See BBSRC Data Sharing Policy 2010 - BBSRC's Position; ESRC Research Data Policy 2010 - ESRC's Policy Statement; UE Policy for Management of Research Data 2011 - Policy; CDC/ATSDR Policy on Releasing and Sharing Data 2005 - Background.

1290 See BBSRC Data Sharing Policy 2010 -Policy Statement; MRC Policy on Data Sharing and Preservation - Policy Statement; CRUK Data Sharing Guidelines 2009 - Cancer Research UK's Stance on Data Sharing.

addition, the policy statements should also place emphasis on costs, data quality and rewards/incentives to data creators/originators who release the research data in open access repository.

Table 8.3.7 Policy Recommendation 7

POLICY STATEMENTS
1. The objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities is to be achieved by releasing the research data to individuals and organisations in and outside Malaysia (which include but not limited to scientific, research and educational communities as well as the general public) with as few restrictions as possible.
2. Publicly funded research data in the Malaysian public universities will be released under the policy for free or at the lowest possible cost, preferably at no more than incremental costs. Costs will be recovered from the data user whose request for the research data requires a significant amount of manual intervention or data is required on non-standard media or in a non-standard format.
3. Enabling open access to and re-use of publicly funded research data in Malaysian public universities does not in any way require the owners/ creators/originators of the research data to waive or abandon their intellectual property rights as some rights could still be reserved. Neither does it endorse any unethical, illegal or irresponsible use or any opportunistic behaviour such as free riding or plagiarism of the research data released under the policy.
4. The university researcher as creator/originator of the research data is entitled to full and appropriate attribution for the research data which is used/re-used by the third party in any publication or derivative works.
5. The university should also recognise the contribution of university researchers who release the research data created/originated by them under the policy in the form of reward, incentives, promotion and tenure evaluation.
6. The research data must be released consistent with the governing laws, codes, ethics, policies, guidelines and contracts applicable to the research data. In particular, data release must not violate data confidentiality, informational privacy, national security or defeat the patentability of the research output.
7. All research data which is subject to data release is to be of high quality and should be managed using standard quality assurance procedures throughout its lifecycle.

8.3.8 Governing Principles

The "policy statements" section may include a brief statement containing the governing principles, plan, or understanding that guides the action.[1291] These guiding principles provide a foundation for a series of questions that need to be addressed in developing policy and practice at national and institutional levels.[1292] The policies analysed in Chapter 7 are built upon/guided by the central principles of open access to publicly funded data outlined in the OECD Principles and Guidelines for Access to Research Data from Public Funding 2007(OECD Principles).[1293] The OECD Principles are based on 13 basic principles comprising the principles of openness, flexibility, transparency, legal conformity, protection of intellectual property, formal responsibility, professionalism, interoperability and quality.[1294] The public research funding agencies in the UK aligned their policies' principles to the RCUK Common Principles on Data Policy.[1295] The policies of several Australian universities have developed their own principles of data access and re-use without specifying whether they adopt any of the existing governing principles.[1296] To align the policy to the international principles on data access and re-use, the policy should adopt the OECD Principles and the RCUK Common Principles on Data Policy.

Table 8.3.8 Policy Recommendation 8

GOVERNING PRINCIPLES
1. The policy adopts the OECD Principles and Guidelines for Access to Research Data from Public Funding, whereby openness, legal conformity, protection of intellectual

1291 University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy.

1292 Research Information Network - Stewardship of Digital Research Data: A Framework of Principles and Guidelines.

1293 See MU Research Data Management Policy 2010, Data Access Principles - Policy Statement; Principles for Access to and Use of MRC Funded Research Data; ESRC Research Data Policy 2010, General Principles, [1.1].

1294 OECD Principles and Guidelines for Access to Research Data from Public Funding 2007, Principles A - M, [III].

1295 See EPSRC Policy on Research Data 2011 – Principles; Principles for Access to and Use of MRC Funded Research Data - Data Access Principles; NERC Data Policy 2011 - Key Principles.

1296 QUT Policy Principles recognise research data as a valuable product of research activity which can assist in promoting open enquiry and debate, complementing research outputs and publications, providing research transparency, and justifying research outcomes. See QUT Management of Research Data Policy 2010, Policy Principles, [2.8.1]. Griffith University Policy Principles among other state that research data should normally be made available to be shared with the wider community wherever possible, giving consideration to the complete life cycle of that data to determine what is appropriate at what stages in the life cycle. See GU Guidelines for Research Data Management (V.4) 2009 - Principles.

property and data quality are the governing principles in pursuing the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

2. In addition, the policy adopts the RCUK Common Principles on Data Policy to further complement/support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.
3. In line with the principles outlined in the OECD Principles and the RCUK Common Principles, the governing principles of the policy are as follows:

    i. Publicly funded research data is a public good, produced in the public interest, which should be made accessible and re-useable in a timely manner for responsible use to both local and international communities on equal terms with as few restrictions as possible.

    ii. Access to and re-use of publicly funded research data in Malaysian public universities should be user-friendly, easily accessible by internet and as much as possible will be made available for free, apart from a few special cases as described in the policy statement, where access to research data will be charged at the lowest possible cost.

    iii. To allow publicly funded research data in Malaysian public universities to be easily discovered and its quality to be effectively assessed by others, sufficient document/metadata should be recorded and made openly available to data users.

    iv. Publicly funded research data in Malaysian public universities should be considered for long-term retention, maintenance and preservation in the appropriate repository/archival/enclave facilities that allows future access and re-use.

    v. It is appropriate to use public funds to support the objective of enabling open access to and re-use of publicly-funded research data in Malaysian public universities. The use of public funds should be both efficient and cost-effective in order to maximise the scientific and socio-economic benefits that can be gained from the said objective.

    vi. Data management and sharing plans should exist for all publicly funded research data in Malaysian public universities and should be in accordance with relevant standards and community best practice.

    vii. Data release for the purpose of enabling open access to and re-use publicly

funded research data in Malaysian public universities must not harm intellectual property rights in research data and must fully comply with legal (which may include intellectual property, privacy, confidentiality, national security, patent and negligence laws), ethics and good research practice.

viii. The objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities must balance the rights, interests and security of all stakeholders. Each and every stakeholder must protect the legal rights, legitimate interests and security of other stakeholders. All stakeholders must acknowledge that the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities may be restricted by legal, ethical and data security requirements.

ix. Open access data providers, in particular university researchers as primary data providers as well as the universities and the repository centres as secondary data providers must be responsible to ensure data quality and integrity of publicly funded research data in Malaysian public universities.

8.3.9 Action Plan

The basic components of a policy may also include an action plan which is a brief statement of a plan that guides the action.[1297] The action plan of the policy should be in the form of data management and sharing plans, as its governing principles require data management and sharing plans to be in place in accordance with relevant standards and community best practice.[1298] The policies analysed in Chapter 7, were either a data management/sharing policy themselves or contain a specific requirement for data management/data sharing plan to be in place.[1299] For the data management and sharing plans to be in accordance to relevant standards and community best practice, it should adopt the data management and sharing plans of the policies analysed in Chapter 7.

1297 University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy.

1298 See Table 8.3.8, General Recommendation No. 8: Governing Principles (vi).

1299 See QUT Management of Research Data Policy 2010, Clause 2.8.5 - Management of Research Data and Primary Materials; GU Guidelines for Research Data Management (V.4) 2009 - Data Management Plan; MU Research Data Management Policy 2010 - Policy Statement; BBSRC Data Sharing Policy 2010 - BBSRC's Position; ESRC Research Data Policy 2010, Data Management and Sharing Plan, [2.3]; EPSRC Policy on Research Data 2011 - Principles; CRUK Data Sharing Guidelines 2009 - Data Management and Sharing Plan; NIH Data Sharing Policy and Implementation Guidance 2003 - Examples of Data Sharing Plans.

Table 8.3.9 Policy Recommendation 9

ACTION PLAN
1. University researchers who apply for internal grants from Malaysian public universities or from universities' external grants and which are fully funded by the Malaysian government, must submit data management and sharing plans as part of their research grant proposal. 2. Data management and sharing plans serve as action plans that carry out the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. 3. Data management and sharing plans will be reviewed as part of the funding decision, whereby the funding committee of the university where the research grant proposal is submitted will assess the adequacy of data management and sharing plans in carrying out the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. 4. The content and format of data management and sharing plans may vary according to the type of data collected. However, data management and sharing plans should be designed using established standards and existing resources where possible. 5. Data management and sharing plans should describe, among others, the research project, types of data to be collected, the originators and owners of the data, volume of data to be managed, documentation/recordkeeping (metadata), storage/retrieval requirements (what procedures/file format/software programs to be used to create, capture, manipulate, store and retrieve the research data and metadata). 6. Data management and sharing plans should also consider legal issues, in particular intellectual property rights in research data, privacy of data subjects, data confidentiality, national security and data quality assurance. 7. The University will assist the university researcher in designing appropriate data management and sharing plans by providing training, support, advice and where necessary provide guidelines, templates and links for the data management and sharing plans to carry out the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. 8. Where enabling open access to and re-use of research data is not appropriate for the proposed research project, the grant applicant must clearly state and explain the reasons in the data management and sharing plans.

8.3.10 Further Information

The policies analysed in Chapter 7 provide information on the office, telephone number, email address or web address of the contact person who can provide further information on the policy to members of the public or university researchers. [1300] In developing the policy, the post of Coordinator for Data Access and Re-Use should be created by the universities. The Coordinator can provide general information on the policy. Besides the Coordinator, the policy should list Intellectual Property Officer, Data Repository Manager, Data Steward and Data Archive/Enclave Manager as the contact persons who can answer specific enquiry pertaining to procedures and guidelines of the policy.

Table 8.3.10 Policy Recommendation 10

FURTHER INFORMATION
1. General information on the policy can be provided by the Coordinator for Data Access and Re-Use of the University at....(office address/e-mail address/phone number to be given). 2. For specific enquiry on intellectual property law/patent law, please contact the University Intellectual Property Officer at.... (office address/e-mail address/phone number to be given). 3. For specific enquiry on various procedures and guidelines of the policy, the following officers can be contacted: i. Enquiry on Data Release Procedure and related guidelines, please contact the Data Repository Manager at.... (office address/e-mail address/phone number to be given); ii. Enquiry on Data Security Procedure and related guidelines, please contact the Data Archive/Enclave Manager at .... (office address/e-mail address/phone number to be given); iii. Enquiry on Data Retention, Maintenance, Preservation and Disposal Procedure and related guidelines, please contact the Data Steward at .... (office address/e-mail address/phone number to be given).

[1300] See QUT Management of Research Data Policy 2010 - Related Documents ; Guidelines for the Management of Research Data at QUT, References, [9.1] & Sources, [9.2]; CDC/ATSDR Policy on Releasing and Sharing Data 2005; UNA Research Data and Materials Management Policy 2008, Accompanying Documents, [10] & Related Documents, [11]; MU Research Data Management Policy 2010 - Related Legislation, Related Policies, Related Documents; VCU Research Data Ownership, Retention and Access Policy 2009 - Related Documents.

8.3.11 References

The policies analysed in Chapter 7 contain references sections that list various legislative and non-legislative documents/sources of the policy.[1301] For ease of reference, the policy should list all the laws, policies, codes and guidelines which have been referred or adopted by the policy.

Table 8.3.11 Policy Recommendation 11

REFERENCES
LAW/LEGISLATIONS
Malaysia
Copyright Act 1987
Communications and Multimedia Act 1998
Contracts Act 1950
Internal Security Act 1960
Official Secrets Act 1972
Patents Act 1983
Personal Data Protection Act 2010
Printing Presses and Publications Act 1984
Other Countries
Copyright Act 1968 (Australia)
Copyright Amendment (Moral Rights) Act 2000 (Commonwealth Australia)
Patents Act 1990 (Commonwealth Australia)
Patents Act 1977 (UK)
United States Code Title 17 Copyright Act 1976
Visual Artists Rights Act of 1990
INTERNATIONAL LAW/CONVENTION
Universal Declaration of Human Rights 1948
International Covenant on Civil and Political Rights
CODES
Malaysian Communications and Multimedia Code Version 6
POLICIES
Malaysia
Innovation and Commercialization Guidelines of UPSI
Intellectual Property Policy of UTM 1999
UPNM Privacy Policy
UPNM Research and Innovation Policy
UUM Privacy Policy
UKM Intellectual Property Policy 2010
UKM Student IP Policy
UM Intellectual Property Policy 2010
UMP Research Policy
UNIMAP Intellectual Property Policy 2007

[1301] See QUT Management of Research Data Policy 2010 - Related Documents ; Guidelines for the Management of Research Data at QUT, References, [9.1] & Sources, [9.2]; CDC/ATSDR Policy on Releasing and Sharing Data 2005; UNA Research Data and Materials Management Policy 2008, Accompanying Documents, [10] & and Related Documents, [11]; MU Research Data Management Policy 2010 - Related Legislation, Related Policies, Related Documents; VCU Research Data Ownership, Retention and Access Policy 2009 - Related Documents.

UNIMAS Intellectual Property Management and Commercialisation Policy (Version 5.0) 2006
UNIMAS Research Policy (Version 7.0) 2006
UKM Privacy Policy
UUM Repository Policies
UM Privacy Policy
UM Research Repository Policies
UNIMAP Privacy Policy
USM Privacy Policy
UTM Web Policy
UPM Institutional Repository Policies
UPM Statute (Intellectual Property) 2003
UPM Research Policy 2009
USM Intellectual Property Policy 2009
UTEM Research Policy 2006
UUM Intellectual Property Policy

Australia

QUT Management of Research Data Policy 2010
University of Newcastle Australia Research Data and Materials Management Policy 2008

The United Kingdom

BBSRC Data Sharing Policy 2010
CRUK Policy on Data Sharing and Preservation 2009
EPSRC Policy on Research Data 2011
ESRC Research Data Policy 2010
MRC Policy on Data Sharing and Preservation
NERC Data Policy 2011
Principles for Access to and Use of MRC Funded Research Data
University of Edinburgh Policy for Management of Research Data 2011

The United States of America

CDC/ATSDR Policy on Releasing and Sharing Data 2005
Division of Earth Sciences of NSF Policy Statement on Dissemination and Sharing of Research Results 2010
NIH Data Sharing Policy and Implementation Guidance 2003
NSF Data Sharing Policy 2011
University of New Hampshire Ownership and Management of Research Data Policy 2007.
University of Tennessee Research Data Policy.
University of Washington Research Data Policy 2008.
Virginia Commonwealth University Research Data Ownership, Retention and Access

GUIDELINES

Malaysia

Submission Guidelines ePrint USM
UPSI Research Guidelines

Other Countries

CRUK Data Sharing Guidelines 2009.
Griffith University Guidelines for Research Data Management (V.4) 2009
Guidelines for the Management of Research Data at QUT.
Implementation Guidance, ESRC Research Data Policy 2010
NSF Award and Administration Guide 2011

PART II PROCEDURES OF THE POLICY

8.4 THE PROCEDURES

Procedures are the required standards, steps or practices that must be undertaken to be consistent and in compliance with policy. Procedures contain mandatory statements that prescribe how the policy is to be implemented. They describe the process and responsibilities for accomplishing tasks governed by the policy. Procedures should be presented in a step-by-step manner. Word choice in the procedure section can also make a difference. Using the word "shall" or "must" indicates that something is required, while the term "should" implies that there might be other options, or that the task associated with it could be bypassed.[1302]

Being an action and regulatory policy, the policy should be implemented by relevant procedures. Based on the governing principles recommended for the policy, several procedures should be developed to implement the policy. Among the procedures are those which deal with data documentation/recordkeeping,[1303] data retention, maintenance and preservation,[1304] data release/sharing,[1305] and data security.[1306] Quite similarly, several policies analysed in Chapter 7 have developed procedures on data release,[1307] data retention/maintenance/preservation,[1308] data documentation/recordkeeping,[1309] and data security.[1310]

1302 See University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy; 'Policy' (2011) *University of Sydney*, <http://sydney.edu.au/legal/policy/university/framework.shtml> (at 27 January 2012).

1303 See Table 8.3.8, General Recommendation No. 8: Governing Principles (iii).

1304 Ibid Governing Principles (iv).

1305 Ibid Governing Principles (vii).

1306 Ibid Governing Principles (viii).

1307 See BBSRC Data Sharing Policy 2010 - Research Grant Proposals, Policy Implementation 1: Integrating Data Sharing into Existing Support and Monitoring Processes, Direct Data Sharing: from Originator to Others; CRUK Data Sharing Guidelines 2009 - Methods for Data Sharing; CRUK Data Sharing Guidelines 2009 - Data Sharing Agreements; NIH Data Sharing Policy and Implementation Guidance 2003, Record Keeping, [2.8.5(g)]; Methods for Data Sharing; NSF Data Sharing Policy 2011; CDC/ATSDR Policy on Releasing and Sharing Data 2005, How to Release Data, Sharing Research Data – Internal, [9.1] – [9.2]; UNH Ownership and Management of Research Data Policy 2007, Sharing Research Data, [9].

1308 See QUT Management of Research Data Policy 2010, Storage, [2.8.5(d)]; QUT Management of Research Data Policy 2010, Retention and Disposal, [2.8.5(e)]; GU Guidelines for Research Data Management (V.4) 2009 - Storage, Preservation and Archiving Data; UNA Research Data and Materials Management Policy 2008 Storage, Preservation and Archiving of Data, [6]; MU Research Data Management Policy 2010; Cancer Research UK Data Sharing Guidelines 2009 - Data Preservation; UNH Ownership and Management of Research Data Policy 2007, Retaining/Maintaining Research Data, [7]; VCU Research Data Ownership, Retention and

Some of the policies analysed in Chapter 7 combine these procedures under one group of procedures. For example, GU Policy combines data archiving and data preservation procedures under one procedure.[1311] CU Policy combines data recording, data retention and data access as a single procedure.[1312] UNH Policy combines data destruction procedure with data retention/maintenance procedure.[1313] Different policies may have a different terms to describe the procedures. For example, BBSRC Policy and CRUK Policy use the term "data sharing" to describe data release procedure.[1314] QUT Policy and UNA Policy use the term "data storage" to describe data retention/maintenance/preservation procedure.[1315] The procedures of the policy should be developed using the procedures of the policies analysed in Chapter 7 as reference.

General and specific recommendations are hereby made on the procedures of the policy. As a general recommendation, the procedures of the policy apply to all research data covered by the policy. Compliance by any person (university researcher, data steward, data archive, data enclave manager) who is subject to the procedures is mandatory. Any person who fails/refuses to give specific and valid reasons for non-compliance with any of these procedures may be subject to the university's internal proceedings normally used to address lack of performance. In addition, the university researcher who fails/refuses to give valid reasons for his/her

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Access Policy 2009 - Retention of Research Data; UW Research Data Policy 2008,– Preservation of Research Data, [IV]; UT Research Data Policy, Clause V – Retention of Research Data.

1309 QUT Management of Research Data Policy 2010, Record Keeping, [2.8.5(c)]; NIH Data Sharing Policy and Implementation Guidance 2003 - Data Documentation.

1310 See GU Guidelines for Research Data Management (V.4) 2009, Security, Access Policies and Provisions and Confidentiality Requirements, [3.9]; ESRC Research Data Policy 2010, Security, [2.5.3]; CRUK Data Sharing Guidelines 2009 - Research Involving Human Participants; CRUK Data Sharing Guidelines 2009 - Data Sharing Agreements; VCU Research Data Ownership, Retention and Access Policy 2009 - Custody of Research Data.

1311 See GU Guidelines for Research Data Management (V.4) 2009 - Storage, Preservation and Archiving Data.

1312 See CU Research Data: Recording, Retention and Access Policy 2007 - Overview of Research Data Recording, Retention and Access Policy.

1313 See UNH Ownership and Managementof Research Data Policy 2007, Destruction of Data, [7.3].

1314 See BBSRC Data Sharing Policy 2010 - Research Grant Proposals, Policy Implementation 1: Integrating Data Sharing into Existing Support and Monitoring Processes, Direct Data Sharing: from Originator to Others; CRUK Data Sharing Guidelines 2009 - Methods for Data Sharing.

1315 See QUT Management of Research Data Policy 2010, Storage, [2.8.5(d)]; UNA Research Data and Materials Management Policy 2008, Storage, Preservation and Archiving of Data, [6].

non-compliance may also risk reduction in funding, restriction of funds or having the entire/remaining payments of the research grant withheld or becoming ineligible for future funding.

Specific recommendations on the procedures of the policy are provided below.

8.4.1 Data Release Procedure

Data Release Procedure is developed to implement the governing principles recommended for the policy which require publicly funded research data to be made accessible and re-useable in timely manner for responsible use to both local and international community on equal terms with as few restrictions as possible. [1316] The procedure is also developed to implement the governing principles which require publicly funded research data in Malaysian public universities to be user-friendly, easily accessible by internet and as much as possible will be made available for free.[1317]

Table 8.4.1 Procedures Recommendation 1

DATA RELEASE PROCEDURE
1. As a general rule, all types of research data which are covered by the policy (whether protected by intellectual property or not) are subject to data release in accordance with this procedure.
2. 'Data release' means free online dissemination of publicly funded research data in Malaysian public universities to the general public (to both local and international community) that results in the creator/originator/owner of the research data no longer has the exclusive control over access to and re-use of the research data.
3. The university researcher who is the creator/originator of the research data shall be responsible to give effect to data release upon the expiry of data exclusivity prescribed in the guidelines of the policy.
4. Where the research data is not protected as intellectual property, the university researcher will give effect to data release together with a notice which explicitly states that its access and re-use is not subject to intellectual property law, but identification of ownership and proper acknowledgment would still be required in accordance with

[1316] See Table 8.3.8, General Recommendation No. 8: Governing Principles (i).
[1317] Ibid Governing Principles (ii).

prevailing science/academic norms.

5. Where the research data is protected as intellectual property, the university researchers shall give effect to data release either as data owner or data custodian.

6. The university researcher shall give effect to data release by using one or a combination of the following methods:

   i. Data release through university –
   Data release can take effect by way of deposition in institutional, faculty, departmental or discipline based online repositories, online database or online data dissemination portal provided by the university.

   ii. Data release through third party –
   Simultaneously, data release can take effect *via* third party mechanisms such as public research funding agencies' data archives/repositories, publishers' open access journals and/or other online community resources, which allows free online dissemination of the research data to the general public.

   iii. Data release under the auspices of the university researcher –
   Where no such resources mentioned above exist, data release can take effect under the auspices of university researchers i.e. to be released directly by university researchers *via* personal blog, social media network (such as Facebook) or other online data dissemination methods.

7. For research data which are published as part of research publication in online open access journals (published data), the Uniform Resource Locator's (URL) link to the published data must be provided by the university researcher as a way of giving effect to data release.

8. Despite its general application, this procedure is not applicable to the research data which are subject to Data Security Procedure of the policy.

8.4.2 Data Security Procedure

Data Security Procedure is developed to implement the governing principles recommended for the policy that require the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities to balance the rights, interests and security of all stakeholders. The governing principles also require the stakeholders to protect the legal rights, legitimate interests and security of

other stakeholders and acknowledge that the objective may be restricted by legal, ethical and data security requirements.[1318]

Table 8.4.2 Procedures Recommendation 2

DATA SECURITY PROCEDURE
1. To protect data security, the university shall implement Data Security Procedure where data release need to be restricted for legal, ethical and security reasons. 2. Data Security Procedure is to be implemented where the research data is subject to: i. non-disclosure duty of confidential research data; ii. the right to informational privacy of subjects of research; iii. novelty requirements in patent law; or iv. protection of national security. 3. The university researcher as primary data provider must protect the research data which is subject to the above list from unauthorised disclosure to the third party by depositing the research data in data archive/enclave provided by the universities or public research funding agencies (hereinafter referred as "Enclave Data"). 4. Where request is made by a third party for disclosure of the Enclave Data, all necessary arrangements must be made in accordance to Data Security Procedure. The Enclave Data is not to be disclosed to the third party until authorisation by way of prior-informed consent is given by the party/parties from whom the Enclave Data were collected or obtained by the university researcher. 5. Where authorisation is successfully obtained by or on behalf of the university researcher, the Enclave Data must be disclosed to the authorised third party by way of confidentiality agreement/non-disclosure agreement/special use agreement. The agreement will serve as a legal mechanism to ensure the legal duty and other obligations/responsibilities of the authorised third party are agreed and understood at the outset and to be complied accordingly. 6. The terms and conditions of the agreement shall indicate the criteria for data access and/or re-use by the authorised third party and can incorporate legal and ethical standards to ensure data security. 7. The agreement must contain a provision which prohibits utilisation/exploitation/manipulation of the Enclave Data by the third party which disclose a confidential data to the general public, identify subjects of research data, defeat the novelty requirements in patent law or prejudicial to the national security. 8. At the point of disclosure, the encryption method must be used by Data

[1318] Ibid Governing Principles (viii).

Archive/Enclave Manager to protect the Enclave Data from unauthorised access and/or re-use. Each and every authorised third party must have a unique user identification. Multi-factor authentication which requires more than one piece of identification should be required before the authorised third party is allowed to access and/or re-use the Enclave Data.

9. In the event unauthorised party is able to gain access to the Enclave Data, a disaster recovery plan must be activated by the Data Archive/Enclave Manager immediately upon the security breach is discovered.
10. This procedure is not applicable to confidential research data; research data which contain direct/indirect identifier or sensitive personal information of identified/identifiable subjects of research data; or research data about invention, which are prepared for release in accordance to the relevant guidelines of the policy.

8.4.3 Data Retention, Preservation, Maintenance and Disposal Procedure

Data Retention, Preservation, Maintenance and Disposal Procedure is developed to implement the governing principles recommended for the policy which require publicly funded research data in Malaysian public universities to be considered for long-term retention, maintenance and preservation in the appropriate repository/archival/enclave facilities which allows future access and re-use.[1319]

Table 8.4.3 Procedures Recommendation 3

DATA RETENTION, MAINTENANCE, PRESERVATION AND DISPOSAL PROCEDURE
1. To allow future access and re-use, all research data which are deposited in the university's online repository/archive/enclave must be retained, maintained, preserved and disposed in accordance to this procedure. 2. The retention, maintenance, preservation and disposal of the research data must be planned and deliberate and should be funded by a combination of research funds and/or through cost recovery. 3. The university which provides the online repository/archive/enclave shall appoint a university's data steward (hereinafter referred as the "Data Steward") who is responsible to implement this procedure. 4. The Data Steward must retain the research data which are deposited in the university's online repository/archive/enclave. 5. The specified period of retention may vary according to the public research funding

[1319] Ibid Governing Principles (iv).

agency's or the university's requirements. At the minimum, the policy expects the research data to be retained for a period of five years following deposit of the research data in the university's online repository/archive/enclave.

6. The Data Steward may exercise his/her discretion to retain the research data with high impact and/or long term socio-economic value for a period beyond the minimum period of retention.
7. To avoid any loss or damage, the research data must be maintained throughout the retention period.
8. The research data which are retained under this procedure must also be preserved in durable formats. When necessary, the research data must be preserved by converting the research data into newer or more accessible formats.
9. Research data may be disposed at the discretion of the Data Steward after the minimum period of retention has been met.
10. During the retention period, unauthorised disposal of the research data from the university's online repository/archive/enclave by way of transfer, removal or any other means is prohibited.
11. Any premature disposal of the research data requires written approval of Data Steward before it can be executed.
12. Disposal of the research data which have been approved by the Data Steward must use secure disposal mechanisms which apply to both confidential and non-confidential research data. Where necessary, a professional data erasing service should be used to remove data on hard disk drives.

8.4.4 Data Documentation and Recordkeeping Procedure

Data Documentation and Recordkeeping Procedure is developed to implement the governing principles recommended for the policy which require sufficient document/metadata to be recorded and made openly available to allow publicly funded research data in Malaysian public universities to be easily discovered and its quality is to be effectively assessed by others.[1320]

[1320] Ibid Governing Principles (iii).

Table 8.4.4 Procedures Recommendation 4

DATA DOCUMENTATION AND RECORDKEEPING PROCEDURE
1. To allow the quality of the research data to be effectively assessed by others, proper document and record (hereinafter known as "Metadata") must accompany all research data which are released to the general public under Data Release Procedure or disclosed to authorised third party under Data Security Procedure 2. For the research data which are released to the general public under Data Release Procedure, the accompanying Metadata must be freely and openly accessible online to assist the general public in the discovery, retrieval and utilisation of the research data. 3. The university researcher as creator/originator of the research data which is released to general public or disclosed to authorised third party, must ensure that the Metadata is concise, accurate, up-to-date, meaningful and consistent. 4. The university researcher must also ensure the content of the Metadata is in compliance with accepted standards and schemas. 5. The precise content of the Metadata will vary by field of research, study design, the type of data collected and characteristics of the dataset. 6. In general, the Metadata must contain information about the methodology and procedures used to collect the data, details about codes, definitions of variables, variable field locations, frequencies and the like. 7. The Metadata must also contain all the information which are necessary for the general public to interpret, understand and use a given data set. The information which could prevent misuse, misinterpretation and confusion to the data users must also be included in the Metadata. 8. The Metadata must also contain sufficient information to facilitate attribution, identification, retrieval and terms of access and re-use.

PART III GUIDELINES OF THE POLICY

8.5 THE GUIDELINES

Compared to procedures, the guidelines are recommended best practices to accomplish tasks but are not required to be in compliance.[1321] Policy guidelines provide advisory and explanatory statements offering any or all of detail, context or recommendations for good practice.[1322] The Research Information Network's Report on Stewardship of Digital Research Data states that different bodies will need to develop their own policy and good practice, in the light of their own particular circumstances.[1323] Due to the existence of the legal impediments to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities, guidelines on the best practice to resolve the legal impediments need to be developed by this thesis.

The guidelines need to be developed as the governing principles recommended for the policy require data release to not harm intellectual property rights in research data and must fully comply with legal (which may include intellectual property, privacy, confidentiality, national security, patent, and negligence laws), ethics and good research practice.[1324] The governing principles also require open access data providers, in particular university researchers, as primary data providers, to be responsible to ensure data quality and integrity.[1325]

Several policies analysed in Chapter 6 and Chapter 7 have their own guidelines to resolve the legal impediments.[1326] CRUK, in its data sharing guidelines, does not

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1321 University of California Davis Guide to Writing and Maintaining Campuswide Administrative Policy

1322 'Policy' (2011) *University of Sydney*, <http://sydney.edu.au/legal/policy/university/framework.shtml> (at 27 January 2012).

1323 Research Information Network - Stewardship of Digital Research Data: A Framework of Principles and Guidelines

1324 See Table 8.3.8, General Recommendation No. 8: Governing Principles (vii).

1325 Ibid Governing Principles (ix).

1326 See QUT Management of Research Data Policy 2010, Access and Re-Use, [2.8.5(g)]; GU Guidelines for Research Data Management (V.4) 2009; UNA Research Data and Materials Management Policy 2008; Principles for Access to and Use of MRC Funded Research Data - General Guidance for All MRC Funded Research Data; ESRC Research Data Policy 2010, Implementation Guidance, [2]; NERC Data Policy - Guidance Notes; CRUK Data Sharing Guidelines 2009; BBSRC Data Sharing Policy 2010, Implementation Guidance, [2]; CRUK Policy on Data Sharing and Preservation 2009, [6]; University of Edinburg's Policy for

prescribe precisely how and when investigators should share research data. Instead the guidelines recognises the diverse nature and field of research that requires different approaches.[1327] The BBSRC Policy also states that policy guidelines should be opened and should avoid being overly prescriptive, unless necessary.[1328] The guidelines on the best practices to resolve the legal impediments are developed with reference to the policies analysed in Chapter 6 and Chapter 7, as well as other relevant sources. Recommendations on the guidelines of the policy are provided below.

8.5.1 Intellectual Property Protection of Research Data

The policies analysed in Chapter 7 resolve the legal impediment arising from intellectual property protection in research data by making it the responsibility of the grantees/researchers/research organisations/principal investigator/university members to make available/release/share/disseminate the research data.[1329] As well as the above policies, the International Council for Science (ICSU) also recommends that governments and other bodies concerned with policy development should ensure full and open access to and re-use of data.[1330] The McKinsey Global Institute Report on Big Data recommends that an effective intellectual property framework be established to enable effective sharing and integration of different pools of data.[1331] The MacArthur Foundation Policies on Intellectual Property Arising Out of the Use of Foundation Funds provide that intellectual property rights (including copyright and patent rights) should not be used to limit or deny access to the grant work product which includes data sets.[1332]

In Australia, it becomes part of the recommendations of the Australian Prime Minister's Science Engineering and Innovation Council (PMSEIC) Data for Science

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Management of Research Data 2011, [7]; UNH Ownership and Management of Research Data Policy 2007, Accessing Research Data, [8]; VCU Research Data Ownership, Retention and Access Policy 2009, Access to Research Data.

1327 See CRUK Data Sharing Guidelines 2009 - Cancer Research UK's Stance on Data Sharing.

1328 See BBSRC Data Sharing Policy 2010 - BBSRC Data Sharing Policy Statement.

1329 See Table 7.3.1 – Related provisions on the legal impediment arising from intellectual property protection in research data.

1330 See Committee on Scientific Planning and Review, above n 29.

1331 See Manyika et al, above n 512, 120.

1332 See 'Policies: Intellectual Property Arising Out of the Use of Foundation Funds' (2008) *The John D and Catherine T MacArthur Foundation*, <http://www.macfound.org/site/c.lkLXJ8MQKrH/b.4804425/> (at 31 August 2010).

Working Group that Australia's intellectual property approaches need to be checked to ensure they do not impede the sharing of data and information.[1333] Scholars and experts in intellectual property and open data such as Uhlir and Schroder also recommend the imbalance in the intellectual property system affecting public research and impeding the open access principle be dealt with accordingly.[1334] Rappert and Webster argue that a sound legal policy is an important mechanism to control the use of intellectual property rights.[1335] Greenleaf in his submission to the Australian Government to unlock intellectual property rights in research argued that free access to publicly funded research data is an important part of any broad notion of public right in works.[1336]

Based on the policies and the recommendations, the best practice to resolve the legal impediment arising from intellectual property protection in research data should be for the policy to require a data owner to permit open access to and re-use of publicly funded research data which is protected by intellectual property.

Table 8.5.1 Guidelines Recommendation 1

RESEARCH DATA PROTECTED AS INTELLECTUAL PROPERTY
1. Research data may be protected as intellectual property under the *Malaysian Copyright Act* especially where sufficient effort has been expended to make the research data as original works.
2. The intellectual property protection of research data does not relinquish the research data from being a subject of data release under the policy.
3. The data owner is required to permit open access to and re-use of the research data in accordance to Data Release Procedure of the policy.
4. Where data owner is the university, the university researcher who is the creator/originator of the research data must be appointed by the university as data custodian to give effect to data release.

1333 See Fitzgerald, Pappalardo and Austin, above n 571, 165.
1334 See Uhlir and Schroder, above n 125, 219
1335 See Brian Rappert and Andrew Webster, 'Regimes of Ordering: The Commercialization of Intellectual Property in Industrial-Academic Collaborations' (1997) 9(2) *Technology Analysis & Strategic Management* 116.
1336 See Greenleaf, above n 891.

8.5.2 Ambiguity About Ownership of Research Data

The policies analysed in Chapter 6 and Chapter 7 resolve the legal impediment arising from ambiguity about ownership of research data by clarifying ambiguity about ownership of research created by: i) a university employee in the course of employment; ii) a university employee outside the course of employment; iii) a non-employee university researcher; iv) a university student; and/or v) a university researcher under research collaboration with a non-university researcher.[1337] In particular, UPM IP Policy analysed in Chapter 6 resolves the legal impediments by clarifying that ownership of publicly funded research data in all five areas of ambiguity are vested in the University. Similarly, BBSRC Policy and UNH Policy analysed in Chapter 7 also vest ownership of research data funded by the university or university administered funds in the University.

The NIH recommends that all institutions receiving research funds should have a written policy that includes provisions for resolving ownership rights in research data.[1338] According to a report by the Australian Department of Education, Science and Technology, universities may claim ownership of intellectual property created using university resources; by academic staff in the course of their employment; and through publicly funded research received as part of an agreement with a government funding agency.[1339]

Based on the policies and the recommendations, the best practice to resolve the legal impediment arising from ambiguity about ownership of research data should be for the policy to clarify ambiguity about ownership of publicly funded research data in all areas of ambiguity.

Table 8.5.2 Guidelines Recommendation 2

OWNERSHIP OF PUBLICLY FUNDED RESEARCH DATA
1. To avoid any ambiguity about ownership and worldwide right, title and interest to or in all publicly funded research data in Malaysian public universities which are covered under the policy, it is hereby clarified that:

1337 See Table 7.3.2 – Related provisions on the legal impediment arising from ambiguity about ownership of research data; Table 6.2.2(a),(b),(c),(d),(e) – Chapter 6.

1338 Nelkin, above n 680, 707.

1339 Christie et al, above n 159. See also, Weisbrot, Opeskin and Finlay, above n 558, 269.

i. Where the research data is created/originated individually or jointly by a university researcher who is an employee of the university (academic, non-academic, permanent, temporary, full-time, part-time or casual employee), full ownership and worldwide right, title and interest to or in the research data is vested in the university where the university researcher is employed regardless whether the research data is originated or created in or outside the course of employment.

ii. Where the research data is created/originated individually or jointly by a university researcher who is a non-employee of the university (such as visitor, associate or adjunct attached to the Malaysian public university under contracts or agreements), full ownership and worldwide right, title and interest to or in the research data is vested in the university where the non-employee university researcher is attached.

iii. Where the research data is created/originated individually or jointly by a university researcher who is a registered student of the university, full ownership and worldwide right, title and interest to or in the research data is vested in the university where the student is registered.

iv. Where the research data is created/originated jointly by a university researcher (employee/non-employee/student) under research collaboration with a non-university researcher, full ownership and worldwide right, title and interest to or in the research data is vested in the university where a university researcher is employed/attached/registered, in equal share with the collaborating party.

2. For the purpose of these guidelines:

i. the terms “employee”, “non-employee” and “student” are to be interpreted in accordance to the law, constitution or policy of each university;

ii. the research data is created/originated individually when the research data is the work of a singular nature, is made up of distinguishable contributions (where each contribution can be identified as coming from a particular researcher) and the research data is independently copyrightable;

iii. the research data is created/originated jointly when the research data is the unified/composite/blended work, is made up of indistinguishable contributions (where each contribution cannot be identified as coming from a particular researcher) or the contribution is distinguishable but copyright of the research data is dependent on the work of other researcher.

8.5.3 Data Owner's Exclusive Rights in Research Data

The policies analysed in Chapter 7 resolve the legal impediment arising from a data owner's exclusive rights in research data by requiring the research data to be deposited in institutional/open access repository after a limited period/embargo which restricts a data owner's exclusive rights in research data.[1340] The UK Joint Information Systems Committee (JISC) also reports that a minimum period of exclusive use known as embargo period or retention period has been recommended by several funding agencies as a mean to control the exclusive rights in research data.[1341]

Based on the policies and the report, the best practice to resolve the legal impediment arising from data owner's exclusive rights in research data should be for the policy to restrict a data owner's exclusive rights in research data.

Table 8.5.3 Guidelines Recommendation 3

DATA EXCLUSIVITY
1. A data owner has a legitimate interest in benefiting from the research data but not in prolonged exclusive use of the research data. 2. A data owner is allowed a limited period of data exclusivity, during which a data owner has the exclusive rights in research data. 3. The period of data exclusivity depends on the requirement of public research funding agency. 4. Where the period of data exclusivity is not fixed by the public research funding agency, it is expected that data release is to be given effect: i) not later than two years from the collection/creation of the research data; or ii) immediately upon the first publication based on the research data; or iii) not later than one year from the end (either by expiry or termination) of the award/grant which funds the collection/creation of the research data; or iv) not later than one year upon completion of the research project for which the research data is collected/created.

[1340] See Table 7.3.3 – Related provisions on the legal impediment arising from data owner's exclusive rights in research data

[1341] See Ruusalep, above n 518, 31-37.

5. The earliest data release of the three options shall be the expiry period of data exclusivity.
6. A longer period of data exclusivity shall be allowed only in exceptional circumstances which must be properly explained in the Data Management and Sharing Plans and subject to approval by the funding agency.
7. Upon the expiry of the data exclusivity, the research data must be released in accordance to Data Release Procedure of the policy .

8.5.4 The Restrictive Scope of the Legitimate Use of Research Data

The policy analysed in Chapter 7 resolves the legal impediment arising from the restrictive scope of the legitimate use of research data by allowing anyone access to the research data, regardless of the purpose for which they intend to use it, including commercial gain.[1342] Kai Ekholm, Chair of IFLA Committee on Freedom of Access to Information and Freedom of Expression (FAIFE) has recommended legitimate alternatives to existing forms of copyright, that increase rather than restrict access to information.[1343] Arzberger et al also recommend restrictions on the rights to access and re-use public data and information, especially by the research community, to be eliminated or minimised as much as possible.[1344] Greenleaf recommends more extensive rights to access and re-use beyond fair dealing exceptions to be allowed, provided it retains the author's moral rights for the work quoted or built upon.[1345]

Uhlir and Schroder also recommend open access in the context of public research data to be opened with the fewest restrictions on re-use.[1346] According to Suber, among the scholarly reasons to except fair use are: i) to quote long excerpts; ii) to distribute full-text copies to students and colleagues; iii) to burn copies on CDs for bandwidth-poor parts of the world; iv) to distribute semantically-tagged or otherwise enhanced (modified) versions; v) to migrate texts to new formats or media to keep them readable as technologies change; vi) to create and archive copies for long term preservation; vii) to include works in a database or mash-up; viii) to make an audio

1342 See Table 7.3.4 – Related provisions on the legal impediment arising from the restrictive scope of the legitimate use of research data

1343 See Kai Ekholm, 'Access to Our Digital Heritage' (2011), <http://www.casalini.it/retreat/2011_docs/ekholm.pdf> (at 8 June 2011).

1344 See Arzberger et al, above n 270, 146.

1345 See Greenleaf, above n 891.

1346 See Uhlir and Schroder, above n 125, 209.

recording of a text; ix) to translate a text into another language; and x) to copy a text for indexing, text mining and other kinds of processing.[1347]

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from the restrictive scope of the legitimate use of research data should be for the policy to allow the right to use publicly funded research data beyond fair dealing exceptions under the *Malaysian Copyright Act.*

Table 8.5.4 Guidelines Recommendation 4

THE LEGITIMATE USE OF RESEARCH DATA
1. The scope of the legitimate use of research data which is released under the policy but protected as copyright works under the *Malaysian Copyright Act* is subject to the fair dealing exceptions provided under the Act. 2. The fair dealing exceptions under the *Malaysian Copyright Act* is restricted to specific purposes, specific types of uses or specific types of bodies or institutions. 3. Pursuant to the governing principles of the policy which requires the research data to be released with as few restrictions as possible, data owner must expand the scope of the legitimate use of research data which are protected by copyright beyond the fair dealing exceptions under the *Malaysian Copyright Act*. 4. For the purpose of clarity, the expansion of the scope of the legitimate use of research data beyond fair dealing exceptions should include: i) for commercial gain; ii) to distribute full-copies of the research data to the public; iii) to burn copies of the research data on CDs for bandwidth-poor parts of the world; iv) to distribute semantically-tagged or otherwise enhanced (modified) versions of the research data; v) to migrate the research data to new formats or media to keep them readable as technologies change; vi) to create and archive the research data for long term preservation; vii) to include the research data in a database or mash-up; viii) to make an audio recording of a textual research data; ix) to translate a text of the research data into another language; and x) to copy a text of the research data for indexing, text mining and

[1347] Suber, above n 1, 73.

other kinds of processing.

8.5.5 Complex and Lengthy Licensing Procedures for Research Data

The policies analysed in Chapter 7 resolve the legal impediment arising from complex and lengthy licensing procedures by adopting licensing procedures that simplify access to and re-use of research data.[1348] There are various other recommendations for copyright licensing to be standardised or simplified by using unilateral/collective/open content/blanket licenses based on advance permission which removes the permission barrier,[1349] making it faster,[1350] simpler,[1351] and more flexible.[1352] The CIDRC Report on Building a Sustainable Framework for Open Access to Research Data Through Information and Communication Technologies recommends a licensing framework that will simplify the licensing procedures and accelerate access to and re-use of research data.[1353] The Director General of WIPO, Francis Gurry also recommends simple but global copyright licensing to ensure that copyright content is available on the most widespread possible basis.[1354]

Janet Hope,[1355] and Charles Lowe,[1356] in their doctoral thesis on open content recommend the adoption of open content licences such as Creative Commons (CC)

1348 See Table 7.3.5 – Related provisions on the legal impediment arising from complex and lengthy procedures for research data.

1349 Open content licensing framework were designed based on permissive licensing model whereby advance permission to access and re-use of the copyrights work is given by the owners to the users. The open content licensing framework seeks to remove permission barrier, by providing a simple licensing system that allows copyright owners to specify exactly what uses of their work are acceptable, and make them available to the world at large. See Woods, above n 601, 38.

1350 Although the license must be issued in writing, it need not be made in the form of contract as a unilateral declaration by the licensor is sufficient. Unilateral licensing would allow simpler and faster mode of licensing. See Peifer, above n 93, 50.

1351 See Ebber, above n 575.

1352 The open content licensing provides a very flexible framework of open access and re-use because it allows the research data to be openly accessible over the internet for use and re-use. Christian, above n 523, 27.

1353 Ibid 22.

1354 See Kim Zwollo, 'Collective Licensing: Enabling Global Content Sharing' (2011), <http://www.casalini.it/retreat/2011_docs/zwollo.pdf> (at 8 June 2011).

1355 Hope has proposed the legal framework of intellectual property law to be reformed through the adoption of Creative Common licenses as part of the effort to promote open source biotechnology. See Janet Elizabeth Hope, *Open Source Biotechnology* (PhD Thesis, The Australian National University, 2004).

1356 Lowe's thesis has proposed open source and open content licensing as a new intellectual property model in digital age. See Charles Lowe, *The Future is Open For Composition*

licences. In Australia, following the Australian Innovation Report, which recommends open access to research outputs, its review panel further recommends making scientific papers and data available in machine searchable repositories under a CC licence.[1357] The Electronic Information for Libraries' (EIFL) report on the Implementation of Open Content Licenses in Developing and Transition Countries, recommends CC licences, the GNU Free Documentation licence and Open Education licence as the open content licences in education and research. EIFL also lists Open Data Commons Public Domain Dedication and Licence (PDDL) and Creative Commons Zero Waiver "No Rights Reserved" (CC0), but acknowledges CC as the most widely used open content licences.[1358]

Fitzgerald argues that the better approach for promoting open access to data is to apply a CC Attribution (CC-BY) licence to the data. CC-BY allows data to be widely shared and used, but also preserves the creator's right to attribution. It is also reported that the open research community has largely selected the CC-BY license as the preferred standard although in specific cases various other licenses are preferred.[1359] Green et al, who published a Guide on Policy-Making for Research Data in Repositories for JISC Data Information Specialists Committee-UK, state that a CC licence provides free tools that let authors, scientists, artists and educators easily mark their creative work with the freedoms they want it to carry so others can share, remix, use commercially or any combination thereof.[1360]

CC licences are more commonly applied to publications or non-scientific research data than to scientific research data. For scientific research data, the allied Science Commons licence is seen as more suitable to enable open access to scientific

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Studies: A New Intellectual Property Model in the Digital Age (PhD Dissertation Thesis, The Florida State University, 2006).

1357 See Harnad, above n 52.

1358 Iryna Kuchma, 'Report on the Implementation of Open Content Licenses in Developing and Transition Countries' (2010) 4, <http://www.eifl.net/cps/sections/services/eifl-oa/docs/report-onimplementation/downloadFile/file/Report_on_open_content_licenses_June.pdf?nocache=1278496158.76 > (at 6 February 2012).

1359 See Fitzgerald, above n 533; Cameron Neylon, 'The Open Practises E-science Network: A Research Network to Enable Data Sharing in the Real World' (2007), <http://precedings.nature.com/documents/1370/version/1/files/npre20071370-1.pdf> (at 20 June 2011).

1360 See DISC-UK DataShare Project - Policy-making for Research Data in Repositories: A Guide (May 2009 Version 1.2)

materials.[1361] However, compared to CC licences, Science Commons' "Protocol for Implementing Open Access Data" is built on the public domain status of data with CC-Zero Waiver License used to implement the protocol.[1362] Creative Commons Version 4.0 License Draft, released for public comment in April 2012,[1363] includes any production in the literary, scientific and artistic domain that are protected as copyright, *sui generis* database rights and other "copyright-like" rights as part of its license subject matter.[1364]

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from complex and lengthy licensing procedures for research data should be for the policy to require licensing procedures that simplify access and re-use of publicly funded research data in Malaysian public universities to be adopted.

Table 8.5.5 Guidelines Recommendation 5

LICENSING RESEARCH DATA
1. Complex and lengthy licensing procedures for research data has resulted licensing research data becomes costly and time consuming and is not well suited to be used in the digital environment. 2. To avoid complex and lengthy licensing procedures, scientific and non-scientific research data which are protected as copyright, *sui generis* database rights or other "copyright-like" rights and which are released under the policy must be licensed under Creative Commons Licence with the most liberal CC Licence which reserves only the right to be attributed as data owner (CC-BY) to be adopted. 3. While Creative Commons Zero Waiver (CC0) licence and Open Data Commons Public Domain Dedication and Licence (PDDL) which are recommended by Science Commons' Protocol for Implementing Open Access Data are more liberal than CC-BY licences, both CC0 and PDDL licences with no rights reserved are inconsistent with

1361 See Fitzgerald, above n 534, 11; Brian Fitzgerald and Kylie Pappalardo, 'The Law as Cyberinfrastructure' (2007) 3(3) *CT Watch Quarterly* 51; Andres Guadamuz Gonzalez, 'Open Science: Open Source Licenses in Scientific Research' (2006) 7(2) *North Carolina Journal of Law & Technology* 345.

1362 Mags McGeever, 'Science Commons', <http://www.dcc.ac.uk/resources/briefing-papers/legal-watch-papers/science-commons> (at 8 May 2012).

1363 Diane Peters, 'Version 4.0 – License Draft Ready for Public Comment!' (2012), <http://creativecommons.org/weblog/entry/32157?utm_campaign=newsletter_1204&utm_medium=blog&utm_source=newsletter> (at 18 May 2012).

1364 '4.0 License Subject Matter' (2012) *Creative Commons*, <http://wiki.creativecommons.org/4.0/License_subject_matter> (at 18 May 2012).

the governing principles of the policy not to harm the intellectual property rights in research data and to balance the interests of all stakeholders.

8.5.6 Author's Moral Right of Integrity

The policies analysed in Chapter 6 and Chapter 7 do not resolve the legal impediment arising from an author's moral right of integrity.[1365] Armstrong et al in their study on Access to Knowledge argue that moral rights protection must be weighed against the possibility that it might add to impediments faced by prospective users of protected materials.[1366] Nicolas Suzor in his thesis on Transformative Use of Copyright Material argues that an author's moral right of integrity should not interfere with legitimate self-expression of future authors.[1367]

A legal analysis in Chapter 5 found that an author's moral right of integrity that exists in Malaysia is much broader, less flexible, more rigid and less clear when compared to the *Australian Copyright Amendment (Moral Rights) Act 2000* (Commonwealth Australia), the *UK Copyright, Designs and Patents Act 1988*, and the *US Visual Artists Rights Act 1990*.[1368] Creative Commons Version 4.0 License Draft which was released for public comment on April 2012 includes waiver or non-assertion of moral rights to the extent necessary to allow licensees to reasonably exercise their rights under the license, with other moral rights retained and unaffected.[1369]

Based on the above recommendations and the legal analysis of Australian, the UK and the US laws, the best practice to resolve the legal impediment arising from an author's moral right of integrity should be for the policy to reconcile an author's

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1365 See Table 6.3.1 - Have the legal impediments which exist under Malaysian laws been resolved by the existing policies of Malaysian public universities?; Chapter 7 - 7.3.1 How did the policies resolve the legal impediments arising from an author's moral right of integrity?; See Table 7.3.6 – Related provisions on the legal impediment arising from an author's moral right of integrity.

1366 See Armstrong et al, above n 617.

1367 See Suzor, above n 622.

1368 See Table 5.2.6 - Author's moral right of integrity.

1369 '4.0 Moral Rights' (2012) *Creative Commons*, <http://wiki.creativecommons.org/4.0/Moral_rights> (at 18 May 2012).

moral right of integrity with the objective of enabling open access to and re-use of publicly funded research data.

Table 8.5.6 Guidelines Recommendation 6

MORAL RIGHTS OF DATA CREATOR/ORIGINATOR
1. The *Malaysian Copyright Act* vests in the data creator or upon data creator's death, in the personal representative of data creator, the moral rights to attribution and integrity which is distinct from the exclusive rights of data owner. 2. The moral right of integrity enables the university researcher who is the creator/originator of the research data to prevent the research data from being distorted, mutilated or modified. 3. The university researcher as the creator/originator of the research data must authorise distortion, mutilation or modification of the research data which are released under the policy. 4. The authorisation must be given in writing prior to/at the time of data release and must expressly authorise distortion, mutilation or modification of the research data which significantly alter the research data. 5. To avoid uncertainty about the extent to which data alteration is allowed, the written authorisation should include a non-assertion pledge by the university researcher not to assert his/her moral right of integrity in the research data.

8.5.7 Non-Disclosure Duty of Confidential Research Data

The policies analysed in Chapter 7 resolve the legal impediment arising from non-disclosure duty of confidential research data by using technical, legal and statistical methods of data release to balance the non-disclosure duty of confidential research data with the objective of enabling open access to and re-use of publicly funded research data.[1370] The US Panel on Data Access for Research Purposes has also made a recommendation for the impediment arising from confidentiality of research data to be addressed by using a variety of modes for data release.[1371] The legal, technical and statistical method of data release has also been recommended by the US National Research Council Committee on National Statistics.[1372]

[1370] See Table 7.3.7 - Related provisions on the legal impediment arising from non-disclosure duty of confidential research data.
[1371] Panel on Data Access for Research Purposes, above n 392, 3, 31.
[1372] Mackie and Bradburn, above n 640, 29, 32.

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from non-disclosure duty of research data should be for the policy to balance the non-disclosure duty of confidential research data with the objective of enabling open access to and re-use of publicly funded research data by using various methods of data release.

Table 8.5.7 Guidelines Recommendation 7

CONFIDENTIAL RESEARCH DATA
1. Data release must be given effect without violating the non-disclosure duty of confidential research data arising from promise of confidentiality, common law duty (tort or equity) or contractual duty such as confidential agreement or non-disclosure agreement. 2. Confidential research rata must be released using statistical methods such as data suppression, data random perturbations, data coding and recoding which protect the confidentiality of the research data. The statistical methods recommended above must balance the non-disclosure duty against the possibility that the methods applied will also reduce the quality and integrity of the research data. 3. Where statistical methods recommended above are not appropriate/possible, data release must not be given effect. Instead, confidential research data must be deposited in data archive/enclave which is provided by the university. The data archive/data enclave where the research data is deposited shall provide a secured, controlled environment where technical mechanisms such as encryption and password are to be used to protect the research data from unauthorised third party's access and re-use. 4. Where the confidential research data is deposited in data archive/enclave, disclosure of the research data may be considered upon *ad hoq* request made by the third party, either individual or organisation. Where *ad hoc* request is made by the third party, disclosure of confidential research data can only take effect after full compliance of the Data Security Procedure of the policy.

8.5.8 The Right to Informational Privacy of Subjects of Research Data

The policies analysed in Chapter 7 resolve the legal impediment arising from the right to informational privacy of subjects of research data by various data redaction methods (de-identification, anonymisation or removal of direct identifiers) to balance the right to informational privacy with the objective of enabling open access

to and re-use of publicly funded research data.[1373] Fink, Godard et al, Kenneally and Claffy, Elliot et al and Chris Yiu have also made a recommendation for policy that balances the right to informational privacy with the need to access and re-use of research data to be developed.[1374] Other parties that made similar recommendations are McKinsey Global Institute Report on Big Data,[1375] the Social Science Federation of Canada,[1376] the US Privacy Protection Study Commission,[1377] the US National Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age,[1378] the UK Data Archive.[1379] Among the organisations with similar recommendation are the Socioeconomic Data and Applications Center (SEDAC) of the Columbia University and the ESRC National Centre for Research Methods.[1380] A report published by Ontario Information and Privacy Commissioner which recommends de-identification as part of data redaction techniques concludes that although there is a risk involving re-identification of de-identified personal data, de-identification remains a strong tool for protecting privacy.[1381]

1373 See Table 7.3.8 – Related provisions on the legal impediment arising from the rights to informational privacy of subjects of research data.

1374 See Fink, above n 643; Godard et al, above n 435, S90; Kenneally and Claffy, above n 669, 5; Mark Elliot, Kingsley Purdam and Duncan Smith, 'Confidential Data Access Using Grid Computing: An Outline of the Issues and Posible Solutions' (Paper presented at the International Conference on e-Social Science 2005, Manchester Conference Centre, 22 – 24 June 2005); Yiu, above n 90.

1375 McKinsey Global Institute Report on Big Data has proposed for policies that balance the interest of the organisations wanting to create value from data and public wanting to protect their privacy and security. See Manyika et al, above n 512, 119.

1376 The Social Science Federation of Canada suggested that the privacy law be formulated with research needs in mind. It was further suggested that, where research access to personal information and data protection law are incompatible, ways should be found to reconcile the data and information needs of social research with the protection of privacy, and to do this within a proper framework. See RJ Bazillion, 'The Effect of Access and Privacy Legislation on the Conduct of Scholarly Research in Canada' (1984) 4 *Social Science Information Studies* 7.

1377 The US Privacy Protection Study Commission also acknowledged that there is a need to strike a proper balance between the individual's personal privacy and society's need for knowledge and information. See Privacy Protection Study Commission, above n 636.

1378 The US National Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age in discussing privacy as obstacle to data sharing, submitted in its report that for some research data, privacy obstacle can be overcome by removing identifiers prior to the sharing or the public release of data. See Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 68.

1379 The UK Data Archive best practices for researchers require that before data obtained from research with people can be shared with other researchers, they may need to be anonymised so that individuals, organisations and businesses cannot be identified from the data. See Van den Eynden et al, above n 143.

1380 See Golden, Downs and Davis-Packard, above n 659; Rose Wiles et al, 'Anonymity and Confidentiality' (ESRC National Centre for Research Methods, 2006).

1381 Ann Cavoukian and Khaled El Emam, 'Dispelling the Myths Surrounding De-identification: Anonymization Remains a Strong Tool for Protecting Privacy' (Information and Privacy Commissioner of Ontario, 2011).

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from non-disclosure duty of research data should be for the policy to balance the non-disclosure duty of confidential research data with the objective of enabling open access to and re-use of publicly funded research data by using data redaction techniques.

Table 8.5.8 Guidelines Recommendation 8

THE INFORMATIONAL PRIVACY OF SUBJECTS OF RESEARCH DATA
1. The law in Malaysia protects unauthorised disclosure and use of personal information which infringe an individual's right to informational privacy. 2. The research data may contain: i. personal information which directly identifies or which could be used to identify subject of research data such as name, address, passport, identity card number, telephone number, e-mail address, photograph, fingerprint, DNA and social security numbers (hereinafter referred as "direct identifier"); ii. indirect identifier that could lead to "deductive disclosure" of subject of research data. Deductive disclosure of subject of research data become more likely when samples are drawn from small geographic areas, rare populations or linked data sets; or iii. sensitive personal information such as health information, genetic information, race, religion, culture, ethnicity, national origin, gender, age, marital status, socio economic status, political opinion, educational background, geographic location, sexual orientation or physical or mental health, ability or condition, criminal or prosecution record of identified or identifiable subject of research data. 3. The research data which contains direct/indirect identifier or sensitive personal information of identified/identifiable subject of research data must only be released to the third party only in a form that protects the right to informational privacy of subject of research data. 4. The research data which contains direct/indirect identifier or sensitive personal information of identified/identifiable subject of research data can only be released with prior-informed consent of subject of research data. 5. In the absence of consent or where consent is not given, the above research data can only be released for the purpose that is compatible with the purpose for which the

research data was collected.

6. Alternatively, the research data can be released for different purposes and without consent from subject of research data after one of the following data redaction techniques is applied:
   i. Anonymisation/de-identification by stripping or removing personal information which become direct identifier;
   ii. Pseudonymisation by replacing direct identifier such as names with numerical identifiers;
   iii. Obfuscation by aggregating or reducing the precision of data, information or a variable;
   iv. perturbation by introducing random errors into individual records whilst preserving descriptive statistics;
   v. generalising the meaning of detailed text; or
   vi. restricting the upper or lower ranges of a variable to hide outliers.
7. Where redaction techniques is not possible, the research data which contains direct/indirect identifier or personal information of identified/identifiable subject of research data must be deposited in data archive/enclave which is provided by the university and can only be released in accordance to Data Security Procedure of the policy.

8.5.9 Protection of National Security

The policies analysed in Chapter 6 and Chapter 7 do not resolve the legal impediment arising from the protection of national security.[1382] The US National Security Decision Directive 189 issued in 1985 states that the policy of the US Government is not to restrict, to the maximum extent possible, the products of unclassified fundamental research.[1383] In a report "Seeking Security: Pathogens, Open Access and Genome Databases", the US National Research Council's Committee on Genomics Database for Bioterrorism Threat Agents states that the classification system has traditionally been used to restrict access to information that

[1382] See Table 6.3.1 - Have the legal impediments which exist under Malaysian laws been resolved by the existing policies of Malaysian public universities?; Table 7.3.9 – Related provisions on the legal impediment arising from protection of national security.

[1383] Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 68.

poses a national security risk.[1384] In resolving the legal impediment arising from the protection of national security, the US National Committee on Ensuring the Utility and Integrity of Research Data in a Digital Age has made a recommendation for the policy makers to draw the line between classified and unclassified data and to balance restrictions on access to sensitive data with the potential costs of such restrictions.[1385]

Based on the recommendation, the best practice to resolve the legal impediment arising from non-disclosure duty of research data should be for the policy to provide the classification of research data of which disclosure is prejudicial to national security. The classification can draw a clear line between classified and unclassified research data.

Table 8.5.9 Guidelines Recommendation 9

CLASSIFIED RESEARCH DATA
1. Data release involving research data of which disclosure is prejudicial to the national security is strictly prohibited regardless whether or not there is any specific law on this matter. 2. The Data Management and Sharing Plans must clarify whether the research data created/originated by the university researcher may contain information which is prejudicial to national security. 3. Disclosure of research data which contains the following information is classified as prejudicial to national security: i. instructions and guidance on bomb-making, biological weapon, illegal drug production or counterfeit products; ii. information and statements with regards to possible terrorist attacks; iii. information which compromise law enforcement activities, incitement to violence, counsels disobedience to the law or to any lawful order; iv. information pertaining to prohibited place, munitions of war, apparatus, equipment, and machinery which are used in the maintenance of the safety and security of Malaysia; v. information with regards to the outbreak of a deadly or contagious diseases; vi. information which could likely lead to a breach of the peace or to promote

[1384] Committee on Genomics Databases for Bioterrorism Threat Agents, 'Seeking Security: Pathogens, Open Access and Genome Databases' (National Research Council, 2004) 48-50.

[1385] Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 68.

feelings of hostility between different races or classes of the population which has a seditious tendency;

vii. information which could likely lead to outbreak of racial, sectarian or political disturbances in general or a specific part of the country; and

viii. documents relating the affairs of states such as military secrets, international affairs or Cabinet documents.

4. The research data which contains any of the information classified above, must be deposited in data archive/enclave and its disclosure is subject to Data Security Procedure of the policy.

8.5.10 Novelty Requirements in Patent Law

The policies analysed in Chapter 6 and Chapter 7 that allow disclosure of research data to be protected/delayed/restricted for the purpose of patent do not resolve the legal impediment arising from novelty requirements in patent law.[1386] The OECD has advised governments to remain vigilant in ensuring that patenting does not hinder access to knowledge or reduce incentives to disseminate knowledge.[1387] Bagley and Eisenberg in two separate works recommend the need for a policy to harmonise between the requirement of academic researchers to patent with the obligation to share the research data with the public or scientific community.[1388] Nelson and Sampat also recommend the need for a university patent policy to emphasise that in most instances the presumption should be wide dissemination of publicly funded research outputs.[1389] In this regard, Sampat suggests the need for guidelines to be issued about when it is appropriate to take out patent and when the outputs of public research should instead be shared with the public.[1390]

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from novelty requirements in patent law should be for the

[1386] See Table 6.3.1 - Have the legal impediments which exist under Malaysian laws been resolved by the existing policies of Malaysian public universities?; Table 7.3.10 – Related provisions on the legal impediment arising from novelty requirements in patent law.

[1387] See 'Declaration on Access to Research Data From Public Funding' (2004) *OECD*, above n 42.

[1388] See Bagley, above n 683, 218; Rebecca S Eisenberg, above n 200, 1013.

[1389] See Richard R Nelson, 'The Market, Economy and the Scientific Commons' (2004) 33 *Research Policy* 1; Sampat, above n 147, 786.

[1390] See Sampat, above n 685.

policy to fix a timeframe for the patent application to be filed to avoid prolonged and unnecessary delay/restriction of data release.

Table 8.5.10 Guidelines Recommendation 10

RESEARCH DATA ABOUT AN INVENTION
1. Data release of the research data about an invention need to be restricted/delayed until patent application is filed in order not to violate the novelty requirements in patent law. 2. To avoid prolonged and unnecessary restriction/delay, decision to patent the invention must be made by the university within six (6) months upon formal notification of the invention by the university researcher. 3. Prior to the decision is made by the university, disclosure of the research data about an invention may be given effect in accordance to Data Security Procedure of the policy. 4. Where the university's decision is not to patent the invention, the research data about an invention must be immediately released in accordance to Data Release Procedure of the policy. 5. Where the university's decision is to patent the invention, the patent application should be filed within six (6) months from the date the decision was made, unless it is shown that it is not possible due to the complexity of the patent to be filed. 6. Regardless of the above provisions, the research data about an invention may be disclosed without violating the novelty requirements in patent law, provided the patent application is filed within one year after its disclosure to the public.

8.5.11 Lack of a Legal Duty to Ensure Data Quality

The policies analysed in Chapter 7 resolve the legal impediment arising from lack of a legal duty to ensure data quality by developing a standard of care on open access data providers to ensure data quality. The policies require data providers to provide sufficient contextual information and documentation in the form of a data management plan and/or high-quality metadata describing the data and its format.[1391] The policies analysed in Chapter 6 to a certain extent resolve the legal impediment as some of the policies impose a standard of care on the university researcher to ensure data quality.[1392] Besides the above policies, the US Office of Management and

[1391] See Table 7.3.11 - Related provisions on the legal impediment arising from lack of a legal duty to ensure data quality.

[1392] See Table 6.2.11 Whether the policies have developed a standard of care on open access providers to ensure data quality?

Budget Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by Federal Agencies 2002 provides a comprehensive guidelines to ensure data quality of research data that are released in open access environment.

To ensure data quality, a data policy and legal issues position paper published by INSPIRE requires data quality procedures to be introduced in order to ensure fitness for purpose and use.[1393] Development of a standard of care to ensure data quality has been recommended in a report published by the US Committee on Ensuring the Utility and Integrity of Research Data in Digital Age as part of the strategy to ensure data quality.[1394] Among the standards of care recommended to be imposed on data providers is the responsibility to properly inform, advise and warn data users on the potential risks related to use/re-use of the data.[1395] There is also a recommendation for data providers to supply the information pertaining to the content and the limitation or defect or potential risk in the data utilisation.[1396] Foong suggests that the information given should contain information pertaining to data quality, source materials, the date the data was last updated and any known limitations of the data. It is further suggested by Foong that advice on the need to obtain independent or professional advice and verification before acting or relying on the information should also be given.[1397]

Based on the above policies and recommendations, the best practice to resolve the legal impediment arising from non-disclosure duty of research data should be for the

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1393 DPLI Working Group, 'INSPIRE Data Policy and Legal Issues Working Group Position Paper' (Infrastructure for Spatial Information in Europe, 2002).

1394 Committee on Ensuring the Utility and Integrity of Research Data in Digital Age, above n 74, 5.

1395 According to Levesque et al there are two types of warnings to be given by data producers– warning of general nature which could be integrated in a user-manual, while specific warning known as context-sensitive warning is prompted at the moment the end-users are facing a risky query or situation. In illustrating data producer's duty to warn, Levesque et al cite the example of the Statistics Canada which includes warnings into census statistics tables made available on the Web to warn people about data uncertainty, their incompatibility regarding temporal comparisons, etc. See MA Levesque et al, 'Towards Managing the Risks of Data Misuse for Spatial Datacubes' (2005), <http://www.itc.nl/ISSDQ2007/proceedings/Session%205%20Dissemination%20and%20Fitness%20for%20Use/paper%20Levesque%5B1%5D.pdf> (at 2 July 2011).

1396 See Awang, Mohd Ariff and Nordin, above n 872, 4.

1397 See Foong, above n 714, 23.

policy to develop a standard of care on open access data providers to ensure data quality.

Table 8.5.11 Guidelines Recommendation 11

DATA PROVIDERS' DUTY TO ENSURE DATA QUALITY
1. The duty to ensure the quality of the research data is shared between the university researcher as creator/originator/custodian of the research data (hereinafter known as the "Primary Data Provider"), the university as data owner and the online repository/archive/enclave where the research data is deposited (The university and data repository/archive/enclave centre are collectively known as "Secondary Data Providers"). 2. For the purpose of the policy, it adopts the definition of data quality given by the US Office of Management and Budget Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by Federal Agencies 2002 (hereinafter referred as the "OMB Guidelines"). 3. Under the OMB Guidelines "Quality" is defined as encompassing utility, objectivity and integrity. Whereby: i. "Utility" refers to the usefulness of the information to its intended users, including the public. ii. "Objectivity" involves objectivity in both presentation and substance. Objectivity in presentation, requires dissemination of information to be presented in an accurate, clear, complete and unbiased manner. Objectivity in substance focuses on ensuring accurate, reliable and unbiased information. In a scientific, financial, or statistical context, the original and supporting data shall be generated, and the analytic results shall be developed, using sound statistical and research methods. iii. "Integrity" refers to the security of information and protection of the information from unauthorised access or revision, to ensure that the information is not compromised through corruption or falsification. 4. Being the Primary Data Provider, the responsibility to ensure data quality ultimately falls on the university researcher. The university researcher must supply the metadata describing the research data which enables data users to assess the quality of the research data. The metadata must be in accordance to the minimum standard required under Data Documentation and Record Keeping Procedure of the Policy. 5. The Data Repository/Archive/Enclave Manager must ensure that the research data is deposited together with the metadata. The Data Repository/Archive/Enclave Manager must require the depositors to declare whether the research data is subject to

evaluation, validation and verification by formal, independent, external peer review in-line with accepted best practice to determine its quality.

6. Where the research data is not subject to peer-review prior to data release, the Data Repository/Archive/Enclave Manager must require the university researcher who is the creator/originator of the research data to properly advise and warn the data users about the fact.
7. Regardless whether or not the research data is peer-reviewed prior to data release, the university researcher must advise and warn the non-expert/non-professional data users on the potential risks related to the use/re-use of the research data.
8. The warning should cover information such as data quality, source materials, the date data was last updated, any known limitations of the data, as well as the limitation, defect or potential risk in the data utilisation. The warning should also include the advise on the need to obtain independent or professional advice and verification before acting or relying based on the research data which are not subject to peer review.
9. The university as owner of the research data must treat data quality assurance as integral to data release. The university should adopt the standard of care to ensure data quality which is provided under the OMB Guidelines and applicable to the university and the university researchers.

8.6 SUMMARY

This chapter has developed a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. The policy developed by this thesis portrays the characteristics of a good policy by being clear, simple and in full compliance with the laws. Besides the main recommendation, this chapter provides various recommendations on the basic components, procedures and guidelines of the policy. In the presence of the procedures and guidelines, the policy should be seen as an action and regulatory policy.

The policy adopts the basic components of the existing policies of public research funding agencies and universities from Australia, the US and the UK which support open access to and re-use of publicly funded research data. The policy also adopts the procedures and the guidelines that are seen as the best practices offered by those policies. This could be achieved as a result of a comparative analysis of the

policies made in Chapter 7 of this thesis. Where there is lacuna/inadequacy in the analysed policies, this thesis refers to various laws, scholarly works and reports in order to get further inputs to develop the policy.

Several provisions of this policy (in particular policy background and purpose) are derived from the findings of this thesis. For example, the policy background is built upon the external benefits underlined by five theories that were examined in Chapter 2. The purpose of the policy is derived from the internal benefits of open access and re-use found in Chapter 3. As a result, the policy background and the purpose of the policy are more extensive compared to similar policies from other countries.

While the policy may share a lot of similarities with the policies from other countries which this thesis compares and adopts, the policy has its own special/unique features. Compared to other policies, the policy provides comprehensive guidelines on the best practices to resolve the legal impediments to the objective of enabling open access to and re-use of publicly funded research data. The policy is a bottom-up policy, unlike the policies in Australia, the UK and the US which are developed top-down by the government and the public research funding agencies. Being a bottom-up policy, the Malaysian public universities play a bigger stakeholder's role and are responsible to provide funds, facilities and expertise to implement the policy.

CHAPTER 9
CONCLUSION

9.1 SYNTHESIS OF THIS THESIS

This thesis commenced with the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. The objective was inspired by the growing worldwide support for open access in general and open access to research data in particular. While open access initiatives initially involved free online access to academic works, scholarly journal papers, primary scientific literature and research results published in open access journals or archived in open access repositories, it now includes open access to pre-published, published and unpublished research data. In light of the emerging trend, this thesis focuses on open access to publicly funded research data. By focusing on publicly funded research data this thesis excluded other types of data, also produced with public funding, from its scope.

The ultimate aim of this thesis is to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. The absence of a policy supporting open access to and re-use of publicly funded research data among public research funding agencies, public research institutions and public universities in Malaysia is the prime motivation behind this aim. Since the Malaysian government has spent a substantial amount of tax payers' money to fund research in Malaysia, it is important for a policy to support the objective to be developed. The public universities are the focus of study, as they are the largest recipients of public research grants in Malaysia. Compared to non-academic sector or private institutions, the public universities operating within the academic sector play a major role in disseminating knowledge and fostering innovation and should be the key stakeholders for such a policy.

This thesis is significant as the advocates of open access, intellectual property scholars and open data experts contend that it is not possible to establish an open access system by default. Rather, a successful data access and re-use regime requires a policy framework to be developed. In developing the policy, six research questions

were set out in this thesis. The qualitative research methodology was adopted to answer the research questions by using a positive and normative analysis approach. The documents analysed comprised mainly primary and secondary legal resources as well as literature from other fields of the social sciences. Overall it could be concluded that the six research questions have been answered by this thesis in accordance to the selected research methodology.

9.2 SUMMARY OF THE FINDINGS AND RECOMMENDATIONS

This section briefly summarises the findings and recommendations that have been discussed at length in Chapter 2 to Chapter 8 of this thesis.

9.2.1 The External Benefits of Enabling Open Access to and Re-Use of Publicly Funded Research Data

Chapter 2 investigated the external benefits of enabling open access to and re-use of publicly funded research data. The external benefits under investigation are the benefits to the society at large. The external benefits of enabling open access to and re-use of publicly funded research data underlined by economic, innovation, public good, social justice and human rights theories were examined. Though these theories are not new, the investigation of the external benefits underlined by these theories to justify the objective of enabling open access to and re-use of publicly funded research data gives new insight to all these theories.

The examination of these theories found that society at large could benefit from open access to and re-use of publicly funded research data. Examination of Evolutionary Economic Theory and New Growth Theory found that knowledge is the building block of the economy. Both economic theories stipulate that economic growth requires interactive and open knowledge, particularly in the era of a knowledge based and networked economy. It follows that socio-economic benefits are gained by enabling open access to and re-use of publicly funded research data that increases the returns of public investment in research.

Similarly, enabling open access to and re-use of publicly funded research data stimulates open innovation and grass-roots innovation. Under innovation theory, ensuring open and timely access by innovators to the relevant data is of key importance as innovation is dependent on the use of previous knowledge. Enabling open access to re-use of publicly funded research data is also beneficial under public good theory. Under this theory research data is treated as public goods as its consumption is non-rival and non-excludable. Being a global public good, research data, particularly in the health, medical and educational fields, benefits the public at large.

Enabling open access to and re-use of publicly funded research data is beneficial under social justice theory as it can reduce the information gap, information divide and information poverty among countries and communities within a country. Under Rawls' and Miller's social justice theory, research data, being part of knowledge and information, is a primary good. Research data, if equitably distributed, can provide equal opportunity to the advantaged and the least advantaged groups to access and re-use the research data.

Finally, enabling open access to and re-use of publicly funded research data is also beneficial under human rights theory and principles. The right to receive and impart information is recognised by the Universal Declaration of Human Rights 1948 (UDHR) and the International Covenant on Civil and Political Rights (ICCPR) as a fundamental human rights. Enabling open access to and re-use of publicly funded research data empowers democratic participation of citizens by giving the right and freedom to receive and impart scientific and non-scientific data and information.

These findings provide a strong justification for the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

9.2.2 The Internal Benefits of Enabling Open Access to and Re-Use of Publicly Funded Research Data

Chapter 3 investigated the internal benefits to individual public universities that enable open access to and re-use of publicly funded research data. The internal benefits under investigation are the benefits that would enhance the work, efficiency or objectives of a public university. The examination of various literature found that enabling open access to and re-use of publicly funded research data is beneficial to the university as well as to university researchers.

First, this chapter investigated the internal benefit in overcoming the accessibility problem faced by university researchers. The accessibility problem occurs as a result of the serial crisis, whereby the cost of subscription to journals in which research data are normally published has increased faster than inflation. The university libraries, which cannot afford this increase in cost, have had to cancel their journal subscriptions. As the toll access business model practised by the journal publishers is seen as the main factor behind the serial crisis, enabling open access to and re-use of publicly funded research data can overcome the accessibility problem faced by university researchers.

Next, the internal benefit in increasing the visibility, citation and impact of university research was investigated. It was reported that the conventional medium of research dissemination such as journal publications and conferences are not efficient and inclusive enough to ensure speedy and worldwide dissemination of research data. Both printed and online journals publish a limited amount of research data to the public, with a large amount of research data remaining unpublished. This has resulted in the visibility, citation and impact of university research suffering a disadvantage under conventional mediums of research dissemination. Enabling open access to and re-use of publicly funded research data can increase the visibility, citation and impact of university research.

This chapter also investigated the internal benefit in detecting scientific fraud by university researchers. The rise of scientific fraud in academia is partly blamed on the failure of a peer review system that is unable to detect scientific fraud such as

data fabrication, data falsification, data forgery or data misrepresentation. Also blamed is the non-availability of primary research data for replication, validation and verification as it is locked-up behind closed access systems. It is found that by enabling open access and re-use the research data can be replicated, validated and verified allowing scientific fraud by university researchers to be detected by other researchers and data users.

Further, this chapter investigated the internal benefit in avoiding unnecessary duplication and repetition of research efforts. Since massive investment of public funds and efforts are required to collect data for research, duplication and repetition of data collections is a waste of money and the researchers'/research participants' time and energy. Enabling open access to and re-use of publicly funded research data can avoid unnecessary duplication and repetition of research efforts. This amounts to greater efficiency and cost saving measures for both the university and university researchers.

This chapter also investigated the internal benefit in facilitating the university's participation in research collaborations. International research collaborations such as e-Science and e-Research are data intensive and require the researchers to freely and openly share their research data. The universities that fail or refuse to share and allow re-use of the research data created/originated by university researchers will not be able to participate in research collaborations and will have to conduct research in isolation. Enabling open access to and re-use of publicly funded research data can facilitate a university's participation in research collaborations.

Investigation was also made of the internal benefit in preserving the academic mission of public universities. The academic mission of a public university is to freely and widely disseminate knowledge and information to the public. This academic mission is under threat due to the incentives given to university researchers to patent and commercialise publicly funded research. Such incentives gradually erode the academic commons and the social gift culture in the university. Academic patenting and commercialisation have also resulted in the "private world of patents" tending to dominate the "open public world of science." The threat to the academic mission that arises from such incentives is evidenced by delayed publication and

denial of access to research findings and data secrecy in order to facilitate patenting and commercialisation. Enabling open access to and re-use of publicly funded research data can preserve the academic mission of public universities.

Finally, this chapter investigated the internal benefit in promoting the norms of open science among university researchers. Academic competition among university researchers has seen the norms of open science, which promotes free and open inquiry in science, often breached. Various reports and studies have found that instead of embracing the norms of open science, data withholding practices and refusals to share data have become a norm among university researchers. Enabling open access to and re-use of publicly funded research data can promote the norms of open science among university researchers.

These findings provide a cogent reason for the Malaysian public universities to enable open access to and re-use of publicly funded research data, in their own interests.

9.2.3 Legal Impediments to the Objective of Enabling Open Access to and Re-Use of Publicly Funded Research Data

Chapter 4 identified the legal impediments to the objective of enabling open access to and re-use of publicly funded research data. The legal impediments have become the fundamental concerns of this thesis and are treated as the research problems which need to be resolved in the policy to be developed by this thesis. While admitting that there are also non-legal impediments, this thesis explained that the task of this chapter is to identify the legal impediments to the objective of enabling open access to and re-use of publicly funded research data. Legal impediments arise when the existence or the absence of legal rights and duties has the effect of restricting, obstructing, hindering or slowing down the objective of enabling open access to and re-use of public funded research data.

This chapter identified 11 legal impediments arising from intellectual property (copyright and database right), confidentiality, privacy, national security, patent and tort laws. The intellectual property protection of research data was identified as one

of the legal impediments to the objective of enabling open access to and re-use of publicly funded research data. Access to and re-use of research data protected by intellectual property law is restricted and subject to permission from the data owner. Intellectual property protection of research data has caused problems in providing open access to and re-use of research data.

This chapter also identified ambiguity about ownership of publicly funded research data as a legal impediment. There is ambiguity about ownership of publicly funded research data created by university employees in and outside the scope of employment. There is also ambiguity about ownership of publicly funded research data created by non-employee researchers and students of the universities. Also ambiguous is the position of publicly funded research data created by university researchers engaged in research collaborations with non-university researchers. In the absence of clear ownership rights, university researchers who are the creators/originators of publicly funded research data are unsure whether they have the right to deposit the research data in open access repositories. Ambiguity about ownership of publicly funded research data hinders data sharing/self-archiving practices/open access participations among university researchers.

Another legal impediment identified in this thesis arises from a data owner's exclusive rights in research data. Data owners who fear they will lose control over the research data will exercise their exclusive rights by refusing to release their research data online as open access materials. Even when the research data is released online, the restrictive scope of the legitimate use of research data emerges as a further legal impediment. Releasing research data online does not mean that its use is unconditional and unrestricted by default. Where the research data is copyright protected, the right to re-use is subject to the scope of the legitimate use prescribed by the law. The scope of the legitimate use is normally restricted to specified users and for a specified use under fair dealing exceptions. The restrictive scope of the legitimate use of the research data has placed data users in a state of uncertainty whether their usage is within the permitted acts or at risk of civil and criminal penalties. Due to the restrictive scope of the legitimate use, the research data which is released as open access material cannot be fully utilised by members of the public.

Due to the restrictive scope of the legitimate use under fair use/fair dealing exceptions of the copyright law, data users are required to obtain permission in the form of a licence from data owners, if they want to use/re-use the research data beyond the scope of the legitimate use provided by the law. In this context, a broad licensing right which is given to the owner of the research data has resulted in licensing research data becoming costly and time consuming. Complex and lengthy licensing procedures are not well suited to be used in the digital environment. Pursuant to this, complex and lengthy licensing procedures for research data have been identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data.

An author's moral right of integrity, which is distinct from the economic rights of data owners, was identified as another legal impediment to the objective of enabling open access to and re-use of publicly funded research data. In the presence of an author's moral right of integrity, data users are required to obtain permission from authors or their personal representatives upon their death before they can significantly alter or modify the research data. The creator or originator of the research data (or their personal representative) could therefore prevent or authorise distortion, alteration or modification of the research data which they feel could tarnish the data creator/originator's honour and reputation.

Besides the legal impediments arising from intellectual property law, this chapter also identified the legal impediments arising from confidentiality, privacy and national security laws. Under confidentiality law, researchers are under contractual, statutory or common law obligations not to disclose confidential research data unless the research participants can be re-contacted for permission. The right to informational privacy which is recognised by personal data protection or privacy laws also becomes a legal impediment to the objective of enabling open access to and re-use of publicly funded research data. Under the right to informational privacy, disclosure and use of personal information against the will or consent of identified or identifiable subjects of research data will violate their right to informational privacy. Also identified is the legal impediment arising from the protection of national security. In most countries the protection of national security is enforced by

legislation. The statutory protection of national security restricts disclosure of research data which is classified as prejudicial to national security.

This chapter also identified a legal impediment arising from the novelty requirements in patent law. Under patent law, premature disclosure of data and information, which is part of the invention, will defeat patentability of the invention. An invention which is disclosed before the patent application is filed is considered as prior art and is no longer novel at the time when the patent application is filed. Therefore, the novelty requirements in patent law require inventors to restrict, limit, delay or withhold disclosure of the research data about an invention until a patent application has been filed. This hinders early disclosure of research data about an invention since the opportunity to patent an invention is lost when or if it is disclosed.

Apart from legal impediments due to the existence of legal rights and duties, this chapter identified lack of a legal duty to ensure data quality as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data. The statutes and case laws in most countries do not impose a duty of care on open access data providers who release the research data voluntarily, for free or without profit to the public. In the absence of a legal duty to ensure data quality, data users need to weigh the benefits of open access to and re-use of the research data against the risks of obtaining incomplete, unfit, inaccurate or erroneous research data.

These findings assist policy makers to anticipate the potential legal impediments to the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities and to find a proper way to resolve the legal impediments at policy level.

9.2.4 Legal Impediments to Open Access and Re-Use Under the Malaysian Laws

Chapter 5 analysed the position under the Malaysian laws with respect to the legal impediments identified in Chapter 4. The Malaysian laws were analysed as well as similar laws in three common law countries i.e. Australia, the UK and the US. Those

laws are intellectual property law (copyright and patent), confidentiality law, privacy law, national security law and the law of tort. The analysis found that all the legal impediments identified in this thesis also exist under the Malaysian law. To be more specific, analysis of the *Malaysian Copyright Act* found that while *sui generis* database rights are not legislated in Malaysia, various types of research data either published or unpublished in the form of textual records, numerical scores, compilation, images and sounds, are eligible for copyright protection under the Act. The copyright law in Malaysia prescribes a lower level of originality for compilations of words, figures or symbols than is required under copyright laws in Australia, the UK and the US. As a result more research data is subject to intellectual property protection.

Analysis of the *Malaysian Copyright Act* also found that there is ambiguity about ownership of research data. It is unclear whether publicly funded research data is created/originated in or outside the employee's course of employment; whether or not publicly funded research data created by a non-employee researcher is commissioned and whether publicly funded research data created by a university researcher in research collaboration is a joint work and if so, whether it is to be shared equally among the collaborators. Under the *Malaysian Copyright Act*, a data owner has the exclusive rights to control reproduction, communication to the public, distribution, adaptation and preparation of derivative works. The exclusive rights in research data enable a data owner to refuse open access to and re-use of publicly funded research data for fear of loss of control over the research data.

Analysis also found that the scope of the legitimate use of research data under the *Malaysian Copyright Act* is very restrictive, especially when compared with the position in Australia, the UK and the US. The fair dealing exceptions under the Act do not allow research for profit, commercial purposes or non-private study. The Act does not clarify what amounts to fair dealing for purposes of non-profit research, private study, criticism, review or the reporting of current events. The Act also does not provide clear guidelines on how much reproduction is allowed under the fair dealing exceptions.

Copyright licensing under the *Malaysian Copyright Act* is complex and potentially time consuming. Licensing of research data under the Act requires data users to negotiate the conditions of licence with the data owner and to reduce the licence conditions to writing. The data owner has a wide range of licensing conditions to choose from, which include the scope, duration and coverage of the licence.

Further analysis of the *Malaysian Copyright Act* found that an author's moral right of integrity is much broader, less flexible, more rigid and less clear when compared to the rights conferred by UK, US and Australian laws. In particular, the moral right of integrity in Malaysia covers all categories of works protected under copyright law. Unlike the laws in Australia, the UK and the US, no express exceptions to the scope of protection are provided. Further, compared to the UK and the US, there is no express provision for waiver of moral rights in the Malaysian copyright law. The *Malaysian Copyright Act* also does not provide a specific defence to infringement of moral right of integrity, like the reasonableness test found in Australian law.

Analysis of the Malaysian statutes and case law also found that there is a legal duty not to disclose confidential research data. The non-disclosure duty in respect of confidential research data is governed either as contractual duty under the *Malaysian Contracts Act* or as common law duty under the law of tort and equity.

The right to informational privacy of subjects of research data is also protected under the Malaysian laws. The rights to informational privacy of subjects of research data is recognised in Malaysia under Art 5(1) of *Federal Constitution of Malaysia*, the *Malaysian Communications and Multimedia Act 1998* and through the application of English common law principles by the Malaysian Courts. Further, there is a statutory duty not to disclose the research data if such disclosure would be prejudicial to the national security. Among the laws imposing this legal duty are the *Internal Security Act 1960*, the *Official Secrets Act 1972*, the *Malaysian Communications and Multimedia Act 1998* and the *Printing Presses and Publications Act 1984*.

The *Malaysian Patents Act* imposes a novelty requirements which require that the prior art of the invention not be disclosed to the public, anywhere in the world, if the invention is to be considered to be novel and eligible for patent protection. The legal

analysis also found that the statutes and judicial decisions in Malaysia do not impose a legal duty on open access data providers to ensure data quality. The legislation and judicial decisions in Malaysia exclude open access data providers from any legal duty to ensure data quality released by them in open access repository. In particular, this exemption applies to a person who provides the information voluntarily, for free or without profit. A similar exemption also applies to data providers categorised as innocent carriers, such as data repository centres and to a person whose information was relied or acted upon by the third party in the absence of a person's prior-knowledge and consent. Also exempted from any legal duty is a person who displays a disclaimer to the third party who may rely on the information, a person who does not know or ought not to know that the user is likely to rely on that information and a person who provides the information but the court finds that it is unfair and unreasonable to impose a duty of care to ensure data quality.

These findings demonstrate that the legal impediments to the objective of enabling open access to and re-use of publicly funded research data identified in Chapter 4 specifically exist under the Malaysian laws.

9.2.5 Legal Impediments Resolved by the Existing Policies of Malaysian Public Universities

Chapter 6 analysed 24 policies and 1 guidelines issued by the Malaysian public universities that are relevant to the identified legal impediments. Analysis was conducted on the existing policies from all three categories of Malaysian public universities i.e. research university, comprehensive university and focus university from each field of specialisation (technical, management, education and defense). The policy analysis covered the intellectual property, research, repository, confidentiality, privacy and security policies of Malaysian public universities.

The analysis found that the majority (nine out of 11) of legal impediments that exist under the Malaysian laws have not been resolved by any of the existing policies of Malaysian public universities. Two legal impediments were found to be partially resolved by one or more existing policies of Malaysian public universities. The UPM IP Policy clarifies all five areas of ambiguity about ownership of publicly funded

research data. Since the policy only applies to UPM, ambiguity about ownership of research data still exists for publicly funded research data created by university researchers in other Malaysian public universities.

The analysis also found that the existing policies of three universities (UNIMAS, UNIMAP and UTEM) have developed a standard of care to ensure data quality. However, the standard of care is only imposed on university researchers. The standard of care provided by the policies does not cover other open access data providers such as the universities and repository centres. The standard of care contained in the UTEM and UMP policies is further limited to published research results. Therefore, the legal impediment arising from lack of a legal duty to ensure data quality has not been fully resolved by the existing policies of Malaysian public universities.

These findings lead to the need to find solutions to the legal impediments which are still unresolved in the existing policies in other countries.

9.2.6 The Policies of Public Research Funding Agencies and Universities from Selected Countries Which Resolved the Legal Impediments

Chapter 7 analysed and compared the policies of public research funding agencies and universities from selected countries which support open access to and re-use of publicly funded research data. Australia, the UK and the US were selected as the countries whose policies of public research funding agencies and universities were analysed and compared. The selection of Australia, the UK and the US was due to the following reasons: i) the legal impediments identified in this thesis were mostly derived from the literature of these countries; ii) these countries share the common law legal system with Malaysia that makes it easier to compare, adapt or adopt the laws and policies from these countries; and iii) these countries were found to be the leading countries in terms of institutional mandates for open access, number of institutional open access repositories and funding agencies with data archiving and open access policies.

While other reports or surveys have compared these policies, this thesis is the first to compare these policies to ascertain various approaches that are used to resolve the legal impediments identified in this thesis. Prior to making the comparison this chapter explained the purpose, criteria and scope of the comparison. The comparative analysis was made to find out the similarities and differences between the policies as well as the special/unique approach of each policy to resolve the legal impediments.

Analysis of 23 policies of public research funding agencies and universities from the selected countries found that only 17 policies contained related provisions on the legal impediments to open access and re-use. These 17 policies were compared to determine how the policies that support open access to and re-use of publicly funded research data resolved the legal impediments. It was found that seven out of 11 legal impediments identified in this thesis were resolved by one or more policies under comparison using diverse methods or techniques. It was also found that four legal impediments were not resolved by any of the policies. The four legal impediments not resolved pertained to ambiguity about ownership of research data, an author's moral right of integrity, protection of national security and the novelty requirements in patent law.

These findings provide valuable inputs in resolving the legal impediments as well as in developing a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

9.2.7 The Policy Developed in this Thesis

Chapter 8 developed a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. The policy developed in this chapter fulfils the aim of this thesis to develop a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. Chapter 8 outlined the key findings of previous chapters in order to justify the need to develop a policy. It also examined the literature relevant to understanding the types of policy to be developed, the basic components of a policy, the characteristics of a good policy and the key stakeholders of a top-down or bottom-up policy.

Based on the key findings and the literature examined above, this thesis developed a policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities. The policy was developed through a set of core recommendations. The main recommendations addressed the type, the basic components, the criteria and the key stakeholders of the policy, which form the starting point for the development of the policy.

The policy was developed in three parts comprising the basic components, procedures and guidelines of the policy. In the first part, the basic components of the policy were developed. There were 11 basic components recommended for the policy. The basic components were the title, policy background, purpose of the policy, applicability and scope, effective date, definitions, policy statements, governing principles, action plan, further information and references.

In the second part, the procedures of the policy were developed. The recommendations set out four mandatory procedures for implementation of the policy. The recommended procedures were: data release procedure; data security procedure; data retention, preservation, maintenance and disposal procedure; and data documentation and recordkeeping procedure. It was also recommended that non-compliance with any of these procedures without specific and valid reasons may be subject to the university's internal proceedings as well as facing the risk of reduction in funding, restriction of funds or having the entire/remaining payments of the research grant withheld or becoming ineligible for future funding.

The third part developed the guidelines of the policy to resolve the legal impediments identified in this thesis. Altogether, 11 best practices to resolve the legal impediments were recommended as guidelines of the policy. In recommending the guidelines, this chapter adopted relevant provisions of the policies analysed in Chapter 6 and Chapter 7. It also adopted recommendations made by various reports, scholars and experts on the best practices to resolve the legal impediments identified in this thesis.

The recommendations on the basic components, procedures and guidelines of the policy provided in this chapter serve as important inputs in the development of a

policy to support the objective of enabling open access to and re-use of publicly funded research data in Malaysian public universities.

9.3 SUGGESTIONS FOR FUTURE RESEARCH

Four opportunities for future research have been identified by this thesis. The opportunity for future research is not limited to legal research only, but also includes research in other fields and disciplines. The future research suggested below can help to expand the current body of knowledge on the legal and non-legal aspects of open access initiatives involving research data and other publicly funded data in various sectors, institutions and organisations not only in Malaysia but also in other countries.

9.3.1 Research to Fill the Gaps Left by this Thesis

In the future, it is suggested that more research to be conducted to fill the gaps left by this thesis. A gap exists as this thesis focused on publicly funded research data in Malaysian public universities. A gap also exists as the policies analysed in this thesis are limited to the existing policies of Malaysian public universities and the policies of public research funding agencies and universities in Australia, the UK and the US. Similarly, the legislation and judicial decisions analysed are also limited to the laws from these countries. Another gap exists because of the emphasis given by this thesis to the legal impediments, as opposed to other types of impediments, to the objective of enabling open access to and re-use of publicly funded research data.

To fill the gaps, it is hereby suggested that other publicly funded data produced by government agencies, department or ministries be chosen as the focus of future research. To complement open access initiatives for research data, future research should also focus on research data in non-digital formats which cannot be released online. In the future, the research should also study the research data funded by the State governments of Malaysia. Future research should also expand the scope of study to include public research institutions in the non-academic sector or publicly funded research data created/originated by private research organisations.

Future research should be undertaken to analyse the policies supporting open access to and re-use of publicly funded research data from other countries such as Canada and the EU countries. The comparative analysis in future research should also include non-common law countries such as France and Germany and other countries which adopt a civil law legal system. It is suggested that research on technical, technological or cultural impediments to the objective of enabling open access to and re-use of publicly funded research data be conducted in future. Finally, since the policy is still at an early stage of development, it is suggested that future research be conducted to determine what other substantive and procedural provisions ought to be incorporated in the policy. The cost to implement the policy could also be a focus of future research.

9.3.2 Research on Possible Amendments to the Existing Policies of Malaysian Public Universities

Future research should be conducted to study the possibility of amending the provisions of the existing policies of Malaysian public universities in order to be consistent with the policy developed by this thesis. Among the provisions of the existing policies which can be studied for possible amendment are the provisions dealing with ownership of publicly funded research data, a data owner's exclusive rights in research data, the scope of the legitimate use of research data, licensing of research data and an author's moral right of integrity. To ensure consistency, the existing policies of Malaysian public universities should be amended to clarify ownership of publicly funded research data, restrict data owner's exclusive rights, broaden the scope of the legitimate use beyond the fair dealing exceptions, simplify copyright licensing for research data and reconcile an author's moral right of integrity in line with the provisions of the policy developed in this thesis. Future research should also study the possibility of amending the provisions of existing policies dealing with confidential research data, the right to informational privacy, the protection of national security, novelty requirements in patent law and data quality so that the policies are consistent with the policy developed in this thesis.

9.3.3 Research on Possible Amendments to the Existing Laws in Malaysia

Future research should be conducted on the possibility of amending the Malaysian laws underpinning the legal impediments identified in this thesis. Future research could study the possibility of amending the *Malaysian Copyright Act* to increase the threshold of originality to the standard that currently prevails in Australia and the US. Research on the possibility of increasing the threshold of originality is important as the *Malaysian Copyright Act* adopts a low threshold of originality which allows more research data to be protected as copyright works. By increasing the threshold of originality, research data which lacks creativity and originality will not be protected by copyright. This in turn will resolve the legal impediments which exist due to the rights and duties imposed under the copyright laws.

Future research should also examine the possibility of expanding the scope of the legitimate use of publicly funded research data. Research should be conducted on the possibility of introducing flexible fair dealing exceptions similar to section 200AB of *Australian Copyright Amendment Act 2006*. Section 200AB allows the use of copyright material that would be beneficial to society. It also allows format shifting, digitisation and adapting works to assist in the operation of archives to produce a more accessible copy of the work. A provision in *Copyright, Designs and Patents Act 1988* (UK) that permits a person who has a right to use the database or any part of the database, to do, in the exercise of that right, anything which is necessary for the purpose of access to and use of the contents of the database or of that part of the database, should also be studied as it could be included as part of fair dealing exceptions in the *Malaysian Copyright Act.* Future research should also study the possibility of providing a set of criteria as guidelines to determine fair dealings and how much reproduction is allowed under fair dealing exceptions as found in the *Australian Copyright Act*. Providing guidelines on fair dealings could avoid uncertainty among the public as to whether or not their use is within the permitted acts.

Future research should also be conducted to study the possibility of excluding an author's moral right of integrity in certain categories of works as provided in the *Copyright Amendment (Moral Rights) Act 2000* (Australia) and the *Copyright,*

Designs and Patents Act 1988 (UK) or to recognise author's moral right of integrity in a specific work only as provided in the *Visual Artists Right Act 1990* (US). The possibility of introducing a provision which allows waiver of moral rights should also be studied. Research should also be conducted on the possibility of introducing a reasonableness test to determine whether there is an infringement of an author's moral right, similar to that provided in the *Australian Copyright Act*.

Finally, it is suggested that research be conducted in the future to study the possibility of amending the *Malaysian Data Protection Act 2010*, to include the right to informational privacy of subjects of research data. The subject of research data is, so far, missing from the scope of personal data protection given under the Act. Although the right to informational privacy was identified as a legal impediment to the objective of enabling open access to and re-use of publicly funded research data, its inclusion could clarify the legal position relating to the release of research data which contains direct/indirect identifiers or sensitive personal information of identified/identifiable subject of research data.

9.3.4 Research on Possible Legislative Intervention to Facilitate Open Access to and Re-Use of Publicly Funded Research Data

Future research should be conducted to study the possibility of introducing laws which could facilitate open access to and re-use of publicly funded research data in Malaysia. The research should consider whether to introduce legislation similar to the proposed *Federal Research Public Access Act* (FRPAA) which requires free online public access to publicly-funded research in the US. Future research should consider whether to introduce a law governing the quality of government funded data disseminated to the public, such as the *Data Quality Act* (DQA) in the US. The DQA is the law which underpins the OMB Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies adopted in the policy.

Future research should also study the possibility of introducing freedom of information laws, such as the *Australian Freedom of Information Act 1982*, *the UK Freedom of Information Act 2000* and *the US Freedom of Information Act 1966*. These laws are instrumental in granting the public the right to receive and impart

information. So far, freedom of information laws have only been introduced at the state level, in Selangor and Penang. There is no equivalent legislation in Malaysia's 11 other states. The state of Selangor passed the *Freedom of Information Enactment* on 1 April 2011, followed by the state of Penang which passed the *Freedom of Information Bill* on 4 November 2011. However, both Acts are restricted to access to state documents and do not apply to publicly funded research data. The introduction of a freedom of information law at the Federal government level should be further researched, particularly the impact such legislation would have on facilitating the objective of enabling open access to and re-use of publicly funded research data in Malaysia.

9.4 CONCLUDING REMARKS

This thesis was proposed in January 2010, at a time when open access had already become a prominent movement as evidenced by the strong support given by the Budapest/Bethesda/Berlin statements for open access initiatives in general and by ICSU/CODATA and OECD for open access to and re-use of publicly funded research data in particular. At the time this thesis was proposed a trend had already emerged, especially among the OECD and EU countries, towards development of policies to support open access to and re-use of publicly funded research data. During the write-up of this thesis from 2010 to 2012, several policies and guidelines which support open access to and re-use of publicly funded research data have been introduced or revised by public research funding agencies and research institutions in OECD countries such as Australia, the UK and the US. These new or revised policies and guidelines were among those examined and analysed in this thesis.

By the time these concluding remarks were written in July 2012, numerous reports and studies on the best practices to resolve the legal impediments to the objective of enabling open access to and re-use of publicly funded research data had been published. The publication of the reports and studies are timely, allowing them to be adopted as part of the recommendations in the development of the policy. Even after the conclusion of this thesis, it is anticipated that further developments will occur as several conferences on open access to research data organised by ICSU/CODATA and Open Knowledge Foundation are scheduled to take place in 2012. Part of the

objectives of these conferences is to support open access to and re-use of publicly funded research data. It is expected that the open access initiatives involving publicly funded research data will continue to grow as more countries and institutions introduce policies as a result of these ongoing developments.

Since the timeline of this thesis coincides with current, emerging and future development of open access initiatives for publicly funded research data, it is hoped that this thesis could inspire further research in the area of access to knowledge, in particular pertaining to open access to and re-use of research data. It is also hoped that that the findings and recommendations made by this thesis will be used as a reference by public research funding agencies and public universities in Malaysia and other countries, especially common law and developing countries.

Finally, it is hoped that the policy developed by this thesis can become a benchmark in pursuing the objective of enabling open access to and re-use of publicly funded data. As the policy was developed based on the policies of public research funding agencies and universities in Australia, the UK and the US, it is of international standard and suitable for adoption by any country that plans to enable open access to and re-use of publicly funded research data. Therefore, not only that Malaysian public research funding agencies and universities can use the policy as their common policy, the universities and research funders in other countries may also adopt it as their institutional or national policy.

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